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ABSTRACT

Papers from the 1979 annual meeting of the North East Association for Institutional Research are presented. The theme of the conference was institutional research and creative change. Part One, Budget/Cost Analysis, contains papers on academic income-cost models for institutional planning, a budget incentive factor within declining enrollments, energy conservation techniques, and instructional cost analysis at a small college. Part Two on Planning presents five papers concerning areas such as creative change through cooperation, long-range planning, the use and misuse of systems approaches, and planning support systems. Part Three, Faculty, examines: faculty resource allocation, software approach to instruction, and faculty goals and activities. Part Four, College/University Community and Institutional Research, contains five papers dealing with areas such as grade inflation, the quality of student life, college attrition, and institutional research at a community college. Part Five, Admissions/Enrollment/Financial Aid, examines tools for marketing management and enrollment trends, factors affecting freshman applicants, and college choice. The final section, Managing Student Enrollment: The Boston College Story, examines information systems, admission processes, financial aid and student attrition as it applies to Boston College. The appendix provides a copy of the conference program. (LC)

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Institutional Research and Creative Change

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Papers from the Sixth Annual Meeting of the
North East Association for Institutional Research

OCTOBER 14, 15 and 16, 1979 • **COOPERSTOWN, NEW YORK**

HE 012 678

INSTITUTIONAL RESEARCH
AND
CREATIVE CHANGE

Papers from the Sixth Annual Meeting
of the
North East Association for Institutional Research

Cooperstown, New York
October 14-16, 1979

PREFACE

The sixth annual conference of the North East Association for Institutional Research was held October 14-16, 1979 at the Otesaga Hotel in Cooperstown, New York. The theme of the conference was *Institutional Research and Creative Change.* A copy of the conference program is included as an appendix to this publication.

There were some 65 participants in the program and 105 registrants at the conference. The papers included in this publication are from the ones which were submitted to the proceedings screening committee, chaired by Pat Terenzini. The papers are published as submitted.

The successful conference was the result of the work of many members. Our appreciation goes especially to Robert Grose (Amherst College), Program Chairman, and Sister Ann Luciano (Western New England College), Local Arrangement Chairman.

Many of the details of arranging the papers for publication were ably handled by Rita Jaros of the Office of Institutional Research, University of Connecticut.

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AN ACADEMIC INCOME-COST MODEL FOR INSTITUTIONAL PLANNING

Edward D. Jordan
The Catholic University Of America

An Academic Unit Income-Cost Model is designed to provide a continuous method of analyzing income and costs associated with the various academic units as related to each other and to the institution as a whole. With the assumptions stated below the model can be used as a management planning tool within the academic community by revealing past trends and possible future expectations. The basic input data are derived from the standard statistical files and the standard auditor's report.

A solvency ratio is derived by taking the ratio of total associated income to total associated costs. Different sets of solvency ratios for each academic unit are developed corresponding to different service credit assumptions for tuition income. Service credit is a term used to describe the redistribution of tuition income to compensate the academic units that provide teaching services to non-major students. An underlying assumption of the Income-Cost Model is that a percentage of tuition income is allocated to the academic unit which claims the student as a major. The remaining percentage of the student's tuition is distributed among those units teaching the major student using the induced course load matrix.

Academic Related Income

Total academic related income allocated to the various academic units is shown in Table I. The income is comprised of Tuition, Service Credit (3 cases), Fees, Sales and Services, Recovery of Indirect Costs and Non-Scholarship Endowment (endowed chairs). On the university level, Tuition and Fees account for 95% of academic related total income, followed by Recovery of Indirect Costs, 3%; and the remaining categories, about 2% of

TABLE I

TOTAL INCOME ($) BY ACADEMIC UNIT (YEAR)

ACADEMIC UNIT	(1) TUITION	(2) SERVICE CREDIT (CASE 1)	(3) SERVICE CREDIT (CASE 2)	(4) SERVICE CREDIT (CASE 3)	(5) FEES	(6) SALES AND SERVICE	(7) RECOVERY OF INDIR COSTS	(8) NON SCHOL ENDOWM	(9) TOTAL INCOME (CASE 1)	(10) TOTAL INCOME (CASE 2)	(11) TOTAL INCOME (CASE 3)
A	6272787	353344	471107	588925	122984	154786	304097	39488	7247486	7365249	7483067
B	825951	12160	16213	20267	21025	4354	3436	0	866926	870978	875033
C	2734489	(544128)	(725476)	(906908)	39347	0	265954	0	2495662	2314314	2132882
D	2219955	(13568)	(18090)	(22614)	85360	0	13060	4142	2308949	2304427	2299903
E	1127408	(90112)	(120145)	(150191)	137157	10198	10203	0	1194855	1164822	1134775
F	1240700	(43136)	(57512)	(71896)	23363	0	67166	875	1288967	1274591	1260207
G	2116015	(371520)	(495341)	(619219)	30239	0	68030	0	1842764	1718944	1595065
H	243019	376640	502167	627753	3632	0	1693	5769	630752	756280	881865
I	1346897	320320	427077	533883	17872	0	0	134968	1820057	1926813	2033620
UNASSIGNED	277335	0	0	0	0	0	0	0	277335	277335	277335
UNIVERSITY	18404556	0	0	0	480978	169338	733639	185242	19973753	19973753	19973753

total income. Note that the Service Credit formulas do not affect university totals, but redistribute tuition income among individual academic units.

Table II outlines the Service Credit calculations. Student credit hours (SCH) taught (column 1) by academic units and SCH taken by student majors are obtained from student statistical files and course enrollment files. The SCH taught is subdivided into SCH taught to majors (column 3) and SCH taught to non-majors (column 4) for the various academic units. SCH taken by majors is listed in column 5. Column 7 represents the net SCH taught by a school or department less the SCH taken by its majors. A positive entry in this column denotes that the academic unit teaches more credit hours to non-majors (service students) than its own majors receive from other academic units. A negative entry indicates that the academic majors receive more credit hours from other academic units than the unit teaches to non-majors.

Service credit rates are computed by dividing the full-time undergraduate tuition rate by 30 (credits), and then multiplying by the percentage to be allocated to the service school or department.

Case 1: \$3200/30 x 60% = \$ 64.00 (60% to service dept; 40% to home dept)
Case 2: \$3200/30 x 80% = \$ 85.33 (80% to service dept; 20% to home dept)
Case 3: \$3200/30 x 100% = \$106.67 (100% to service dept; 0% to home dept)

The Case 1 (60%/40%) distribution has been in effect since the initial presentation of the Income-Cost Model for 1971-72. The Case 2 (80%/20%) distribution has been added to enable comparability with some other selected universities, which operate under the 80%/20% model. State universities often are budgeted by the Case 3 (100%/0%) distribution of tuition income.

TABLE II

SERVICE CREDIT BY ACADEMIC UNIT (YEAR)

ACADEMIC UNIT	(1) SCH TAU ACAD YR	(2) ADJ SCH TAU ACAD YR	(3) SCH TAU MAJORS ACAD YR	(4) SCH TAU NON-MAJ ACAD YR	(5) SCH TAK ACAD YR	(6) ADJ SCH TAK ACAD YR	(7) SCH TAU LESS SCH TAK	(8) SERVICE CREDIT (CASE 1)	(9) SERVICE CREDIT (CASE 2)	(10) SERVICE CREDIT (CASE 3)
A	52807	52807	39794	13013	47286	47286	5521	353344	471107	588925
B	4883	4883	3851	1032	4693	4693	190	12160	16213	20267
C	15699	15699	15118	581	24201	24201	(8502)	(544128)	(725476)	(906908)
D	17501	17501	17420	81	17713	17713	(212)	(13568)	(18090)	(22614)
E	8787	8787	8109	678	10195	10195	(1408)	(90112)	(120145)	(150191)
F	9664	9664	9457	207	10338	10338	(674)	(43136)	(57512)	(71896)
G	10993	10993	10896	97	16798	16798	(5805)	(371520)	(495341)	(619219)
H	7509	7509	1407	6102	1624	1624	5885	376640	502167	627753
I	14232	14232	8199	6033	9227	9227	5005	320320	427077	533883
UNIVERSITY	142075	142075	0	0	142075	142075	0	0	0	0

Academic Unit Costs

The total cost of each academic unit is developed. Total Direct Cost consists of Instruction, Library, Student Aid, Academic Space Charges, Public Service and Academic Computer Charges. "Modified" direct cost excludes academic space charges, student aid and continuing education and workshop expenditure from the direct cost total. It is upon this modified direct cost base that associated Indirect Costs are distributed. Indirect cost categories are Student Services, Institutional Support, Non-Academic Plant and Mandatory Transfers. These categories combined give an indirect cost rate of 39% when applied to modified direct costs.

An example of the percentage distributions of some of the major expenditure items as related to direct and total costs would be:

	Amount	Percentage of Direct Cost	Percentage of Total Cost
Instruction	$12,731,997	66.1%	51.1%
Library	1,557,383	8.1	6.2
Student Aid	2,704,060	14.0	10.9
Academic Space	1,659,239	8.6	6.7
Other	625,187	3.2	2.5
Total Direct Cost	$19,277,866	100.0%	77.4%
Student Services	1,343,962		5.4
Institutional Support	2,688,843		10.8
Plant (Non-Academic)	1,108,115		4.4
Mandatory Transfers	494,349		2.0
Total Indirect Cost	$ 5,635,269		22.6%
Total Cost	$24,913,135		100.0%

Solvency Ratios

The academic unit solvency ratio is derived by dividing total academic associated income by total associated costs. Table III presents three sets of solvency ratios for each school, corresponding to the three service credit assumptions on tuition income. The results of the different

TABLE III

SOLVENCY BY ACADEMIC UNIT (YEAR)

ACADEMIC UNIT	(1) INCOME (CASE 1)	(2) INCOME (CASE 2)	(3) INCOME (CASE 3)	(4) COST	(5) SOLVENCY (CASE 1)	(6) SOLVENCY (CASE 2)	(7) SOLVENCY (CASE 3)
A	7247486	7365249	7483067	10266521	70.59	71.74	72.89
B	866926	870978	875033	1211969	71.53	71.86	72.20
C	2495662	2314314	2132882	3367778	74.10	68.72	63.33
D	2308949	2304427	2299903	2250232	102.61	102.41	102.21
E	1194855	1164822	1134775	1689792	70.71	68.93	67.15
F	1288967	1274591	1260207	1204503	107.01	105.82	104.62
G	1842764	1718944	1595065	1629654	113.08	105.48	97.88
H	630752	756280	881865	873109	72.24	86.62	101.00
I	1820057	1926813	2033620	2170411	83.86	88.78	93.70
UNASSIGNED	277335	277335	277335	249166	111.31	111.31	111.31
UNIVERSITY	19973753	19973753	19973753	24913135	80.17	80.17	80.17

service credit assumptions are kept separate, leading to three cases of income and also three different solvency ratios. It should be noted that these service credit assumptions change the distribution of total university tuition income among the various academic units; however, the total university tuition income remains unchanged under these assumptions and hence university-wide solvency ratios remain constant for the three cases.

The university-wide solvency ratio of 80.17% indicates that the income associated with the academic units accounts for 80.17% of the total operating costs of the university (excluding separately funded operations such as auxiliary enterprises, sponsored research, etc.). In order to achieve a balanced financial condition, the remaining 19.83% of income is obtained from outside sources such as private gifts. For the individual schools or departments, a solvency ratio above 100% indicates that the total associated income exceeds the total associated cost and contributes to the university as a whole.

Subsidies

The subsidy of an academic unit represents the difference, in dollars, between income and costs. Table IV presents the direct cost subsidy (columns 2, 3 and 4) defined as total income less direct cost, and the total cost subsidy (columns 6, 7 and 8) defined as total income less total cost. The three different income assumptions can result in three subsidy levels for each academic unit. A positive direct cost subsidy indicates recovery of all direct costs and a contribution toward associated indirect costs. A negative direct cost subsidy indicates a partial recovery of direct costs.

TABLE IV

SUBSIDY ($) BY ACADEMIC UNIT (YEAR)

ACAD UNIT	(1) DIRECT COST	(2) DIRECT COST SUBSIDY (1)	(3) DIRECT COST SUBSIDY (2)	(4) DIRECT COST SUBSIDY (3)	(5) TOTAL COST	(6) TOTAL COST SUBSICY (1)	(7) TOTAL COST SUBSIDY (2)	(8) TOTAL COST SUBSIDY (3)
A	7996959	(749473)	(631710)	(513892)	10266521	(3019035)	(2901272)	(2783454)
B	931837	(64911)	(60859)	(56804)	1211969	(345043)	(340991)	(336936)
C	2650798	(155136)	(336484)	(517916)	3367778	(872116)	(1053464)	(1234896)
D	1696022	612927	608405	603881	2250232	58717	54195	49671
E	1303149	(108294)	(138327)	(168374)	1689792	(494937)	(524970)	(555017)
F	900551	388416	374040	359656	1204503	84464	70088	55704
G	1243213	599551	475731	351852	1629654	213110	89290	(34589)
H	643183	(12431)	113097	238682	873109	(242357)	(116829)	8756
I	1662988	157069	263825	370632	2170411	(350354)	(243598)	(136791)
UNASSIGNED	249166	28169	28169	28169	249166	28169	28169	28169
UNIVERSITY	19277866	695887	695887	695887	24913135	(4939382)	(4939382)	(4939382)

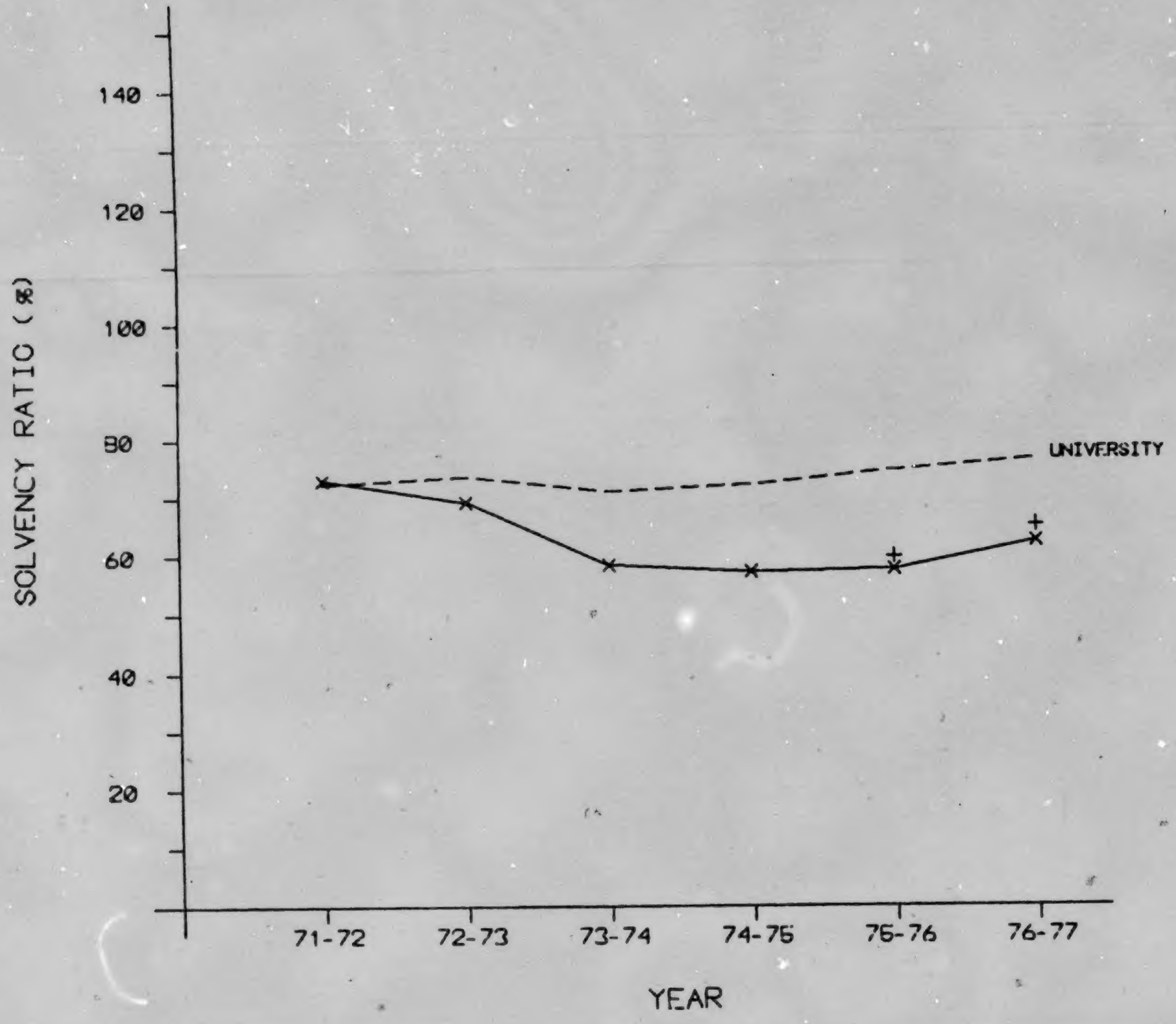
It should be noted that "direct cost" is defined to include instruction expenditures, prorated distributions of library costs, student aid, academic space charges, public service expenditures (where appropriate) and academic computer costs.

For the university, total academic related income exceeds direct costs; hence a positive direct cost subsidy is indicated for the university as a whole. Among the schools the direct cost subsidy ranged from a high of $749,473 to a contribution of $612,927 by one school. Individual academic units with solvency ratios of less than 100%, but a positive direct cost subsidy, have met all direct costs and have made a partial contribution toward associated indirect costs. A negative direct cost subsidy shows only partial recovery of direct costs.

A positive total cost subsidy (columns 6, 7 and 8) indicates that the academic unit has met all direct and associated indirect costs, and from a university viewpoint is helping to reduce dependency on outside revenue. This is equivalent to a solvency ratio of 100% or greater.

Solvency ratios over a time frame of several years can be plotted by computer graphics techniques to develop longitudinal trends as shown in Figure 1 for the university and one of the academic units.

FIGURE 1
LONGITUDINAL SOLVENCY RATIO
(1971-72 TO 1976-77)



PHILOSOPHY

71-72	72.23
72-73	69.07
73-74	58.25
74-75	57.15
75-76	57.53
76-77	62.29
75-76+	59.67
76-77+	65.04

+ - DIRECT ALLOCATION
OF ACADEMIC SPACE.

A Formula Budgeting Incentive Factor in a Declining Enrollment Environment

John J. Kehoe
Pennsylvania Department of Education

During the last 20 years, higher education had experienced a phenomenal rate of growth. This growth had been characterized by rapid enrollment increases resulting in higher operating budgets and expansion of facilities. In order to cope with the rising costs associated with such growth, state government appropriations increased 375 percent between 1960 and 1970 (Chambers, 1969, p. 854). As this increase in appropriations continued, it became more evident that greater objectivity should be exercised in determining institutional needs and allocating funds. In the 1960's, the formula approach to budgeting was examined with renewed interest as an effective tool to plan and allocate the ever-increasing appropriations equitably.

This fact was also confirmed by Rourke and Brooks who state, "Many legislators assert that the determination of an overall level of support for higher education within a state...can be made rather quickly in any legislative session. The real conflict arises over the distribution of funds among state institutions of higher education. It is here that an allocation formula enters the picture as a politically acceptable means of slicing the academic pie." (Rourke & Brooks, 1966, p. 79)

The 1970's, however, have painted a different picture. The public, in witnessing its income eroded by taxes and inflation, had become less willing to support higher education programs that were unnecessary and inefficient. In addition to this, the public wanted greater control of its resources through greater institutional autonomy. As Hale and Rawson pointed out, the higher education governing and coordinating agencies were confronted with the problem of responding to accountability pressures without usurping institutional autonomy (Hale and Rawson, 1976, p. 19). As a result, statewide funding formulas were again relied upon this time as an accountability instrument in the allocation of funds. Internal allocations were to be determined by the institutions themselves.

Types of Formulas

It is generally accepted that there are two basic types of formulas used in funding higher education--base formulas and functional formulas (Western Interstate Commission for Higher Education, 1969, p. 48).

The base formula uses percentage factors of the total cost of the instructional program to estimate future funding in a specific budget area. The computational method used in this formula is the percentage of base factor method (PBF) which assumes a correlation between an established base factor, such as total faculty salaries and certain other activities (Gross, 1973, p. 86). This type of formula has a certain logical appeal since the primary function of higher education is the teaching of students, and other activities are subordinate to this function (Gross, 1973, p. 86). Although the base formula is relatively easy to prepare and present, Miller argues that this simplicity helps to create basic weaknesses. These weaknesses include a lack of consistent relationship between workload factors such as libraries, physical plant operation and maintenance, and faculty salaries (Miller, 1964).

Functional formulas use factors directly related to a specific budget category in establishing future funding requirements (Hale and Rawson, p. 23). This type of formula can be more dependable in projecting budget costs since workload factors related to expenditures are included in the calculations. Two widely used computational methods are identified with functional formulas--the rate-per-base factor unit (RBFU) and the base-factor position ratio with salary rates (RF-PR/SR) method. The rate-per base-factor unit is determined by multiplying a given base factor, such as credit hours or enrollment, times a specific unit rate previously determined through experience. The base-factor position ratio with salary rates justifies the number of employee positions as a result of a preestablished base factor and the number of personnel. These employee positions are then multiplied by the average salary in each level to determine the total employee costs.

Due to the inherent nature of such formulas, certain issues regarding formula implementation have been raised. Some critics maintain that budget formulas, due to their generalizability within states, are incapable of recognizing and, thus, fostering program quality. They further contend that learning, not production, should be the basic function of an institution (Moss and Gaither, op cit. p. 554).

Another criticism is that budget formulas have a great potential for a "leveling" effect. This effect, which is the product of equalization, tends to help the low-quality institutions at the expense of the higher-quality institutions creating, in essence, a leveling of quality.

Budget formulas have also been criticized on the basis of using factors existing at a certain point in time, This inflexibility may result in inadequate operating appropriations in subsequent years.

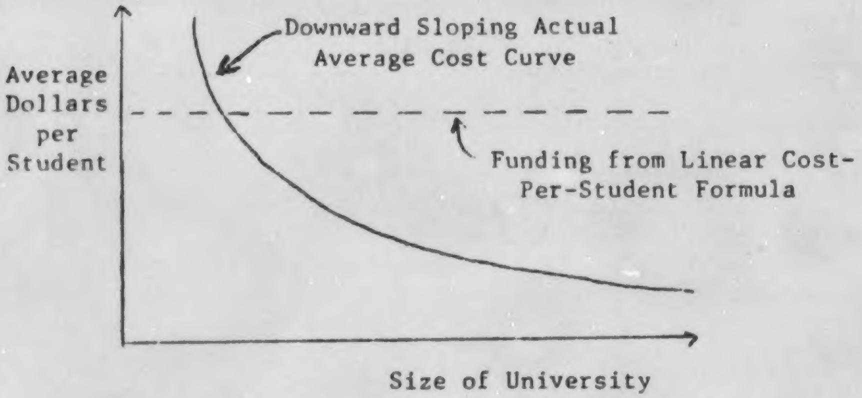
Perhaps the most serious criticism attributed to budget formulas is their unresponsiveness to declining enrollment. As enrollment in higher educational institutions declines, the capacity to provide adequate resources diminishes.

Budget Formulas are Unresponsive to Declining Enrollments

This criticism is extremely important at this point in time when all indications point to a future decline in college enrollment. This inability to cope with declining enrollment is primarily due to the linear nature of most formulas. As Figure 1 indicates, linear cost formulas are unable to recognize the economies of scale principle.

Figure 1

Theoretical Comparison of Average Cost Curve with Funding from Linear Cost-Per-Student Formula



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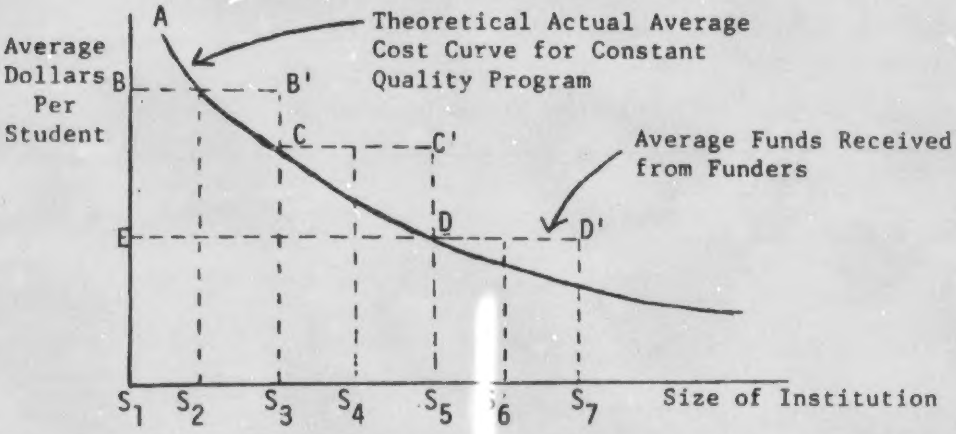
As this figure indicates, the level of average dollars per student remains the same as the cost per student declines with increasing enrollment. Such formulas tend to be an increasing burden on funders as enrollment increases. Nevertheless, as Boutwell indicates, "some educators not only chose to ignore this downward sloping cost curve, but actually claimed that it did not exist." (Boutwell, 1973)

Due to this increased strain on funders, revisions to formulas emerged to provide cost savings. Such revisions recognized that economies of scale could be realized, despite the objections from educators that an erosion of quality would occur. This effect of formula adjusting is illustrated in Figure 2.

Figure 2

Theoretical Comparison of Average Cost
Curve and Average Funds Received Per Student



Source: W. K. Boutwell, "Formula Budgeting on the Down Side," in G. Kaludis (ed.) Strategies for Budgeting, San Francisco: Jossey-Bass, Summer 1973, p. 44.

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As Figure 2 indicates, funders have successfully adjusted the formulas to reduce levels of funding as economies of scale are realized. A problem for educators emerges, however, when enrollments decrease. Having long espoused the validity of the linear formula concept, they are finding funders arguing that budget reductions must be absorbed at a rate equal to the ED' line.

At this point, it becomes apparent that the most perferable technique for incorporating these factors is the Base Factor/Position Ratio with Salary Rates. Gross feels that this method is preferable for the instruction category since, unlike the Rate per Base Factor method, it would not:

1. imperil the quality of undergraduate education over a period of time.
2. increase the cost differentiation between graduate and undergraduate education, or
3. promote the proliferations of graduate programs (Gross, op cit., p. 101).

In addition to this (as noted earlier) linear cost per student formulas (such as the PBF method) ignore the economies of scale principle. The Percentage of Base Factor method, on the other hand, does not provide the flexibility and objectivity needed to accurately consider institutional needs.

The problem still remains, however, of how to cope with declining enrollments. From a central funding agency's perspective funding should be consistent, equitable and efficient. Consistency implies adherence to the policies and missions of the agency and institutions served. Equitability is the means of ensuring that similar institutions are treated similarly. The equitability level is most easily operationalized at the lowest possible level of funding--the programmatic level. Efficiency is the process whereby adequate levels of assistance are provided for adequate levels of need. Efficiency is most easily operationalized through the economy of scale principle. This principle is most easily seen graphically, whereby unit cost decreases as size increases.

In order to ensure economy of operation, certain standards should be established. Such standards, as full-time enrollment and student/faculty ratios, have been utilized at both the institutional and state level as adequate indicators of prevailing conditions. Incentives should be given as standards are met (or approximated) and discentives provided as standards are not adhered to.

The student/faculty ratio is the actual ratio that the institution had been operating with in that year. The basic premise behind an incentive provision in the formula is that there is an optimum student/faculty ratio that institutions should strive for. This optimum represents the full entitlement (1.0) that only districts achieving this figure can attain. Institutions above and below this figure are, in effect, penalized in direct proportion to the distance of their student/faculty ratio from this optimum.

These institutions with ratios above this optimum figure may, on the surface, appear to be extremely efficient in their operation. In reality, however, this may not be an ideal situation. It has been postulated that the quality of programs would be adversely affected as the ratio increases. In addition, as enrollments continue to decline, faculty bargaining agreements will tend to protect the increasing numbers of tenured professors, thus resulting in a slower rate of attrition. Another consideration, and perhaps the most important one, is the necessity for preserving institutional viability in the face of declining enrollment. Such a provision would enable a cost-effective institution encumbered with a large faculty to effectively cope with declining enrollment, while preserving those programs and operations deemed essential to its survival.

On the other side of the coin, an institution whose student/faculty ratio is below the optimum would tend to be rewarded as it makes an effort to achieve the optimum. This incentive would help improve the efficiency of these institutions in helping to reduce costs. As a protection for these institutions against declining enrollments, the optimum student/faculty ratio could be adjusted downward as conditions warrant.

As a result, the mathematical relationship of the instructional components can best be examined in the following expression:

$$\text{Total Projected Credit Hours} \div \text{Full-Time Hours per FTE} \times \text{Weight for Level of Instruction} \div \text{Student/Faculty Ratio} \times$$

$$\text{Incentive} \times \text{Avg. Ins. Cost Per Faculty Member} = \text{Total Needed for Instruction}$$

The incentive is calculated as follows:

If actual student/faculty ratio is greater than optimum student/faculty ratio, Incentive = Optimum ÷ Actual.

If actual student/faculty ratio is less than or equal to optimum student/faculty ratio, Incentive = Actual ÷ Optimum.

The actual and formulated per pupil instructional costs were then compared for the 14 Pennsylvania state colleges at four possible stages of enrollment: the same enrollment, 5 percent enrollment decline, 10 percent enrollment decline, and 15 percent enrollment decline. As can be expected when controlling for total costs, each 5 percent decline in enrollment increases the actual per pupil funding costs. However, the incentive factor has the effect of reducing the magnitude of the formulated per pupil cost and in many cases keeps this figure constant as their incentive factor decreases.

This phenomenon is illustrated in Table 1.

The graphic representations of the actual and formulated systemwide distributions in Table 1 are presented in Figure 3. As enrollments decline the actual distribution maintains the same relationship but simply moves higher on the Y-axis (as per pupil costs increase). The formulated distributions, however, take a different pattern as enrollments begin to decline. A significant curvilinear relationship begins to emerge illustrating a greater economy of scale. This economy is maximized with a 10 percent enrollment decline (with these cost figures) and begins to become straighter and more horizontal with a 15 percent enrollment decline. This illustrates that at this point, the optimum student-faculty ratio may be in need of revision. The specific mix or shape of the distribution is flexible and may change as the individual requirements of the system warrant, thus providing an effective mechanism for policy review.

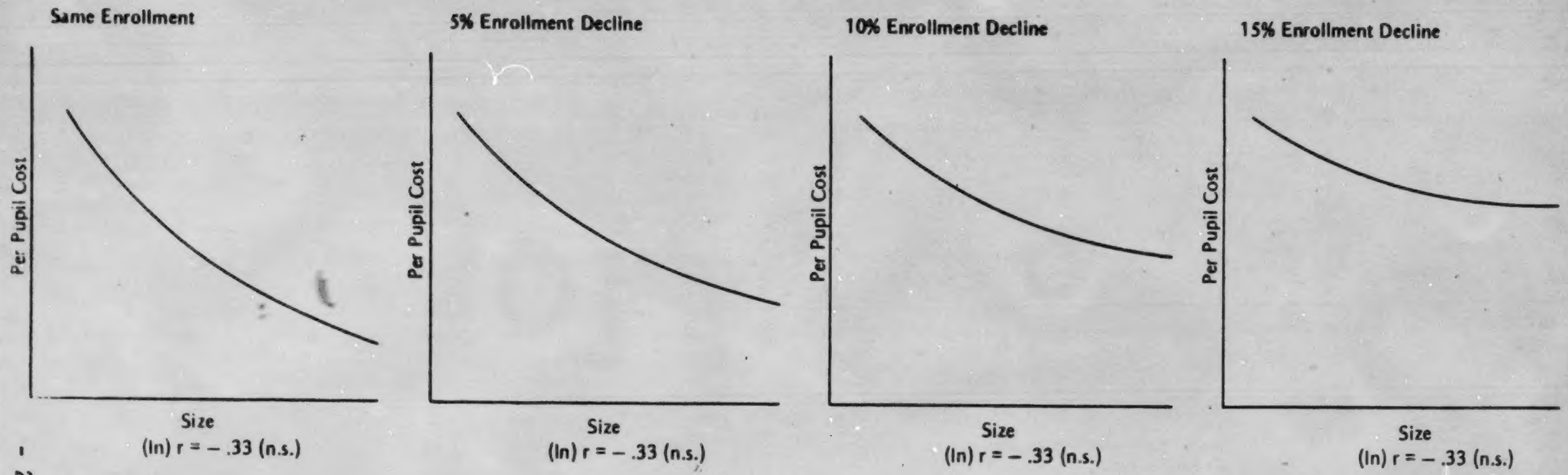
Table 1

ACTUAL AND FORMULATED PER PUPIL COSTS FOR VARIOUS LEVELS OF ENROLLMENT

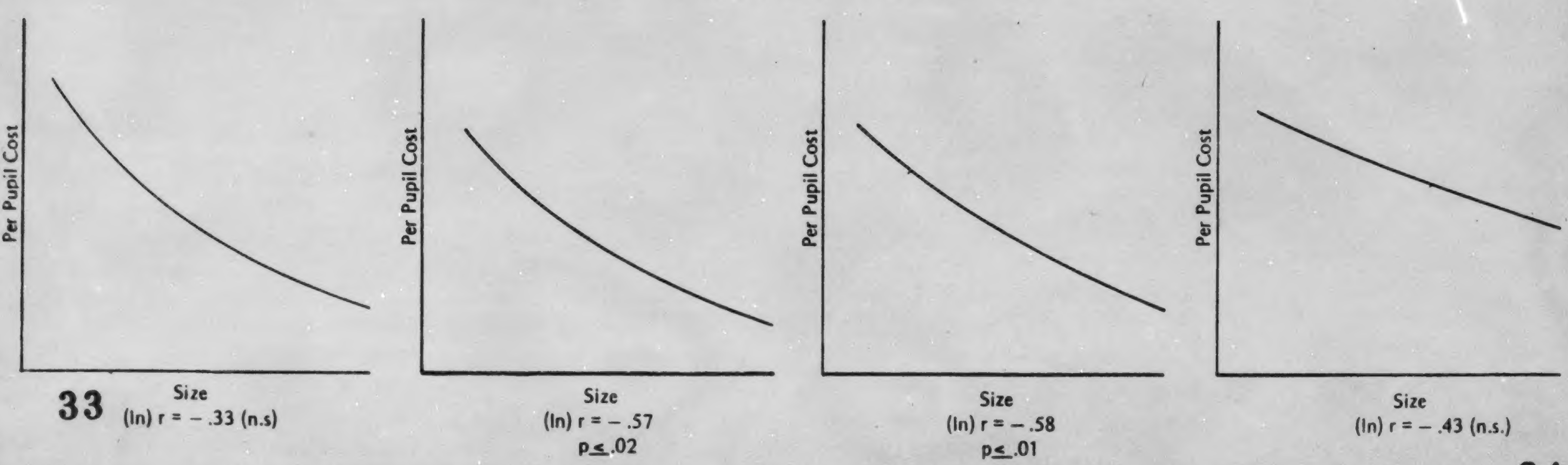
INSTITUTION	100%		95%		90%		85%	
	Actual	Formulated	Actual	Formulated	Actual	Formulated	Actual	Formulated
	$	$	$	$	$	$	$	$
1	1174	1124	1235	1225	1304	1225	1381	1225
	(.9523)		(.9578)		(.9500)		(.9000)	
2	1577	1412	1660	1412	1752	1412	1855	1412
	(.8947)		(.8420)		(.7890)		(.7368)	
3	1298	1219	1366	1351	1442	1382	1527	1382
	(.9473)		(.9643)		(.9444)		(.8888)	
4	1414	1220	1488	1352	1571	1507	1663	1638
	(.8695)		(.9090)		(.9523)		(.9762)	
5	1227	1105	1292	1224	1364	1363	1444	1363
	(.9047)		(.9500)		(.9961)		(.9473)	
6	1593	1273	1677	1273	1770	1273	1874	1273
	(.8000)		(.7500)		(.7000)		(.6600)	
7	1270	1213	1337	1213	1411	1213	1494	1213
	(.9545)		(.9090)		(.8636)		(.8181)	
8	1409	1308	1483	1308	1566	1308	1658	1308
	(.9500)		(.9000)		(.8500)		(.8000)	
9	1440	1386	1516	1386	1600	1386	1694	1386
	(.9444)		(.8888)		(.8568)		(.8333)	
10	1605	1375	1690	1375	1784	1375	1889	1375
	(.8421)		(.7894)		(.7654)		(.7368)	
11	1401	1069	1474	1185	1556	1320	1648	1480
	(.7692)		(.8000)		(.8333)		(.9090)	
12	1240	1163	1306	1288	1378	1324	1459	1324
	(.9523)		(.9578)		(.9500)		(.9000)	
13	1335	1253	1406	1388	1484	1424	1571	1424
	(.9536)		(.9582)		(.9507)		(.9030)	
14	1266	1175	1333	1175	1407	1175	1490	1175
	(.9047)		(.8743)		(.8571)		(.8095)	

Figure 3

ACTUAL DISTRIBUTION



FORMULATED DISTRIBUTION



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Energy Conservation Techniques for Schools

Peter J. Philliou

Wentworth Institute of Technology

Schools consume 11% of the total energy expended in the United States for environmental control of buildings. This results in the cost of utilities for educational facilities being estimated at two billion dollars during the 1976-1977 school year - a 33% increase in two years - and puts education in a difficult position, caught between rising costs and angry taxpayers. The future looks gloomy for school administrators who are faced with rising fuel costs and declining enrollment which mean energy will consume a higher and higher percentage of the school budget dollar.

I believe the technology and "know how" exist in order to keep energy costs reasonable. This is a big issue. It cannot be covered completely within the limits of this proposal so I will concentrate on methodology - how to attack the problem rather than on detailed procedure. With each school building there are many variables such as:

1. age and building condition
2. type of control systems
3. occupancy pattern
4. degree of comfort required for learning
5. heating and cooling systems
6. others

One approach is to consider energy conservation in buildings in three stages.

Stage 1: Less fuel to do less work. This is the easiest to understand and the easiest to implement. Examples are: turning down the thermostats and turning off the lights.

Stage 2: Less fuel to do the same work. This is just as easy to understand although far less easy to accomplish. It takes some designing and some investment. Examples are: adding building insulation, installing storm windows and changing incandescent lighting to flourescent. This state of conservation involves the intelligent use of known methods, components, and information rather than the development and modification of technology.

At Wentworth Institute of Technology we are utilizing a computer program to optimize the savings with each modification. Let me now briefly discuss the inputs to the program and what results can be obtained.

Figure #1 presents a schematic of input data to the computer program. The output from the programs are:

(1) where all the energy is consumed per year
(2) comparative savings which would result from various energy conservation alternatives
(3) computation of life cycle costs

Today I will show results for one building, Beatty Hall, at Wentworth. It is a general purpose building and contains the library, cafeteria, classrooms, offices and a student center.

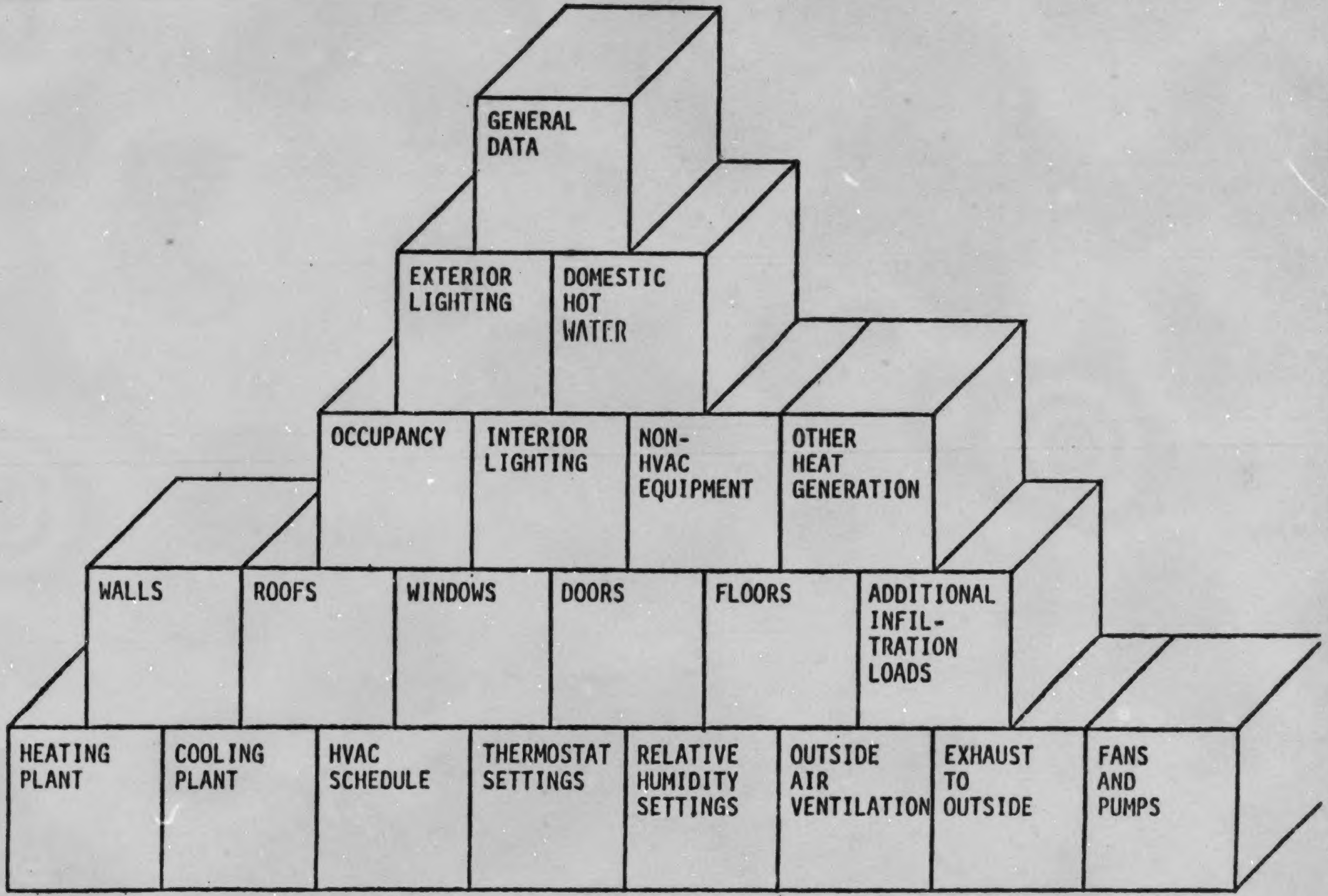
Figure #2 is a summary showing where and how all the energy is being consumed per year in Beatty Hall. Note that it includes heating, domestic hot water, interior lighting and fans.

The next step is to compare savings which would result from various energy conservation alternatives. I will look at two today:

(a) reduced outside ventilation
(b) reduced lighting

Figure #1

ENERGY ANALYST INPUT DATA



GENERAL DATA
- GENERAL DATA

MISCELLANEOUS ENERGY USE
- EXTERIOR LIGHTING
- DOMESTIC HOT WATER

INTERNAL LOADS
- OCCUPANCY
- INTERIOR LIGHTING
- NON-HVAC EQUIPMENT
- OTHER HEAT GENERATION

SHELL LOADS
- WALLS
- ROOFS
- WINDOWS
- DOORS
- FLOORS
- ADDITIONAL INFILTRATION LOADS

HVAC SYSTEM
- HEATING PLANT
- COOLING PLANT
- HVAC SCHEDULE
- THERMOSTAT SETTINGS
- RELATIVE HUMIDITY SETTINGS
- OUTSIDE AIR VENTILATION
- EXHAUST TO OUTSIDE
- FANS AND PUMPS

Figure #2

```
                 * B U I L D I N G   E N E R G Y   A N A L Y S T *

                          * MULTI PURPOSE BLDG - BEATTY1 *


                          ****************************
                          *** HEATING ENERGY REPORT ***
                          ****************************

                                        MBTU       DLRS      o/o
WALL CONDUCTION                       400350       1716    11o/o
ROOF CONDUCTION                       287884       1234     8o/o
WINDOW COND/SHG                      1562196       6695    43o/o
WINDOW INFILTRATION                   208026        892     6o/o
DOOR CONDUCTION                        17486         75     0o/o
DOOR INFILTRATION                     371882       1594    10o/o
OUTSIDE VENTILATION                  2064167       8846    56o/o
OCCUPANTS                            ¯180000       ¯771    ¯5o/o
LIGHTING                            ¯1020982      ¯4376   ¯28o/o
ADD'L HEAT GENER                      ¯46080       ¯197    ¯1o/o
TOTAL                                3664930      15707   100o/o

HEATING FUEL          - GAL            37397      15707    41o/o


                             *************************
                             *** OTHER ENERGY USE ***
                             *************************

                                         QTY       DLRS      o/o
DOMESTIC HOT WATER    - GAL              203         85     0o/o
INT. LIGHTING         - KWH           418803      19684    52o/o
FANS                  - KWH            55651       2616     7o/o


                          ******************************
                          *** TOTAL FUEL CONSUMPTION ***
                          ******************************

                                         QTY       DLRS      o/o

TOTAL
     DIST OIL (GAL)                    37600      15792    41o/o
     ELECTRIC (KWH)                   474454      22299    59o/o
     TOTAL MBTU                      6883311      38091   100o/o
```

40

```
ENERGY USAGE INDEX:          62.58 MBTU/SQFT
COST INDEX:                    .35 DLRS/SQFT
```

Figure #3 presents the computer output for the reduced outside ventilation case. This results in a 56% savings ($4965) for the outside ventilation energy costs. Note also a savings of $1609 on fan power since a smaller motor is required. The cost of a new motor and installation is $3275 which results in a first year savings of approximately $3300 or a simple payback of six months.

Figure #4 presents the computer output for the reduced lighting case. This results in an interior lighting savings of 25% or $4986. However, there is a loss of $1108 in the heating balance which results in a net savings of approximately $3900 per year.

Additional studies have been made on storm windows (payback of eight years) and wall insulation (payback of 9½ years). These have not been recommended because of the long payback period. Note that if government matching funds were available it would be feasible to go ahead with the storm windows and wall insulation.

Stage 3: Less fuel to do more work. This stage offers the greatest opportunity for fuel conservation, but extensive research and development is needed to accomplish these savings. Cogeneration is the example I will address today. The concept is, however, not new. It was recognized early by local power companies who sold steam produced in conjunction with electricity for heating and industrial use. There are many different technical methods devised, all of them based on the fact that generating electricity wastes about twice as much energy in the form of heat as can be turned into electricity.

In the Final Report of the Governor's Commission on Cogeneration, "cogeneration" is defined as the "simultaneous production of electricity and

Figure #3

```
                 * BUILDING ENERGY ANALYST *

                * REDUCE VENTILATION - VENT *
                     * COMPARED WITH *
             * MULTI PURPOSE BLDG - BEATTY1 *
                     1/11/79    9:58:8


                *****************************
                *** HEATING ENERGY REPORT ***
                *****************************

                              MBTU      DLRS    %  DLRS SAVINGS    %
WALL CONDUCTION             400350      1716   16%            0    0%
ROOF CONDUCTION             287884      1234   11%            0    0%
WINDOW COND/SHG            1562196      6695   62%            0    0%
WINDOW INFILTRATION         208026       892    8%            0    0%
DOOR CONDUCTION              17486        75    1%            0    0%
DOOR INFILTRATION           371882      1594   15%            0    0%
OUTSIDE VENTILATION         905783      3882   36%         4965   56%
OCCUPANTS                  ¯180000      ¯771   ¯7%            0    0%
LIGHTING                  ¯1020982     ¯4376  ¯41%            0    0%
ADD'L HEAT GENER            ¯46080      ¯197   ¯2%            0    0%
TOTAL                      2506545     10742  100%         4965   32%

HEATING FUEL        - GAL    25577     10742   34%         4965   32%


                  ************************
                  *** OTHER ENERGY USE ***
                  ************************

                               QTY      DLRS    %  DLRS SAVINGS    %
DOMESTIC HOT WATER - GAL       203        85    0%            0    0%
INT. LIGHTING      - KWH    418803     19684   62%            0    0%
FANS               - KWH     21413      1006    3%         1609   62%


                ******************************
                *** TOTAL FUEL CONSUMPTION ***
                ******************************

                               QTY      DLRS    %  DLRS SAVINGS    %
TOTAL
     DIST OIL (GAL)          25780     10827   34%         4965   31%
     ELECTRIC (KWH)         440216     20690   66%         1609    7%
     TOTAL MBTU            5111623     31518  100%         6574   17%

                 __ __ __ __ ____      __

 ENERGY USAGE INDEX:     46.47 MBTU/SQFT
 COST INDEX:               .29 DLRS/SQFT
```

Figure #4

```
              * B U I L D I N G   E N E R G Y   A N A L Y S T *

                         * REDUCE LIGHTING - BEATTY1 *
                              * COMPARED WITH *
                        * MULTI PURPOSE BLDG - BEATTY1 *
                            1/11/79    10:19:49


                        ******************************
                        *** HEATING ENERGY REPORT ***
                        ******************************

                                  MBTU      DLRS    o/o DLRS SAVINGS   o/o
WALL CONDUCTION                 400350      1716   10o/o           0    0o/o
ROOF CONDUCTION                 287884      1234    7o/o           0    0o/o
WINDOW COND/SHG                1562196      6695   40o/o           0    0o/o
WINDOW INFILTRATION             208026       892    5o/o           0    0o/o
DOOR CONDUCTION                  17486        75    0o/o           0    0o/o
DOOR INFILTRATION               371232      1594    9o/o           0    0o/o
OUTSIDE VENTILATION            2064167      8846   53o/o           0    0o/o
OCCUPANTS                      ¯180000      ¯771   ¯5o/o           0    0o/o
LIGHTING                       ¯762386     ¯3267  ¯19o/o       ¯1108   25o/o
ADD'L HEAT GENER                ¯46080      ¯197   ¯1o/o           0    0o/o
TOTAL                          3923526     16815  100o/o       ¯1108   ¯7o/o

HEATING FUEL        - GAL        40036     16815   49o/o       ¯1108   ¯7o/o


                           ************************
                           *** OTHER ENERGY USE ***
                           ************************

                                   QTY      DLRS    o/o DLRS SAVINGS   o/o
DOMESTIC HOT WATER - GAL           203        85    0o/o           0    0o/o
INT. LIGHTING      - KWH        312728     14698   43o/o        4986   25o/o
FANS               - KWH         55651      2616    8o/o           0    0o/o


                        ********************************
                        *** TOTAL FUEL CONSUMPTION ***
                        ********************************

                                   QTY      DLRS    o/o DLRS SAVINGS   o/o

TOTAL
     DIST OIL (GAL)              40239     16900   49o/o       ¯1108   ¯7o/o
     ELECTRIC (KWH)             368379     17314   51o/o        4986   22o/o
     TOTAL MBTU                6890700     34214  100o/o        3877   10o/o

     ENERGY USAGE INDEX:       62.64 MBTU/SQFT
     COST INDEX:                 .31 DLRS/SQFT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useful heat."

There are many applications and they all look like Figure #5 where we generate electricity and the exhausts (gases and water jackets) are utilized for heating and/or cooling. I will look at two applications. One I will call "total energy systems" where the diesel generator system is used to generate all the electrical needs thereby making no connection with the local utility and using the exhausts for all heating, cooling and hot water needs. Figure #6 shows a list of projects by Cummins in operation or being designed. One total system in a school is in the Boston area. The Malden Catholic is equipped with three diesel powered generators. The heat by-product is used to warm the high school, supply hot water, and to provide cooling. The three diesels provide .18 megawatts each and only two are needed at any one time, the third in reserve. The original capital costs of the three engines as well as the boilers were paid off at the end of the plant's seventh year.

The second application I will call "peak shaving." Figure #7 shows the electrical demand profile for Wentworth. The two 100 kw diesel generators were used to shave off 200 kw from 8:00 a.m. to 2:00 p.m. five days a week. Figure #8 presents the assumptions used in the cost study, and Figure #9 gives the results for two cases:

(a) savings without heat exchangers

(b) savings with engine block and exhaust recovery units

The savings for case (a) is $817 per month, and an additional $420 per month is saved using heat exchangers.

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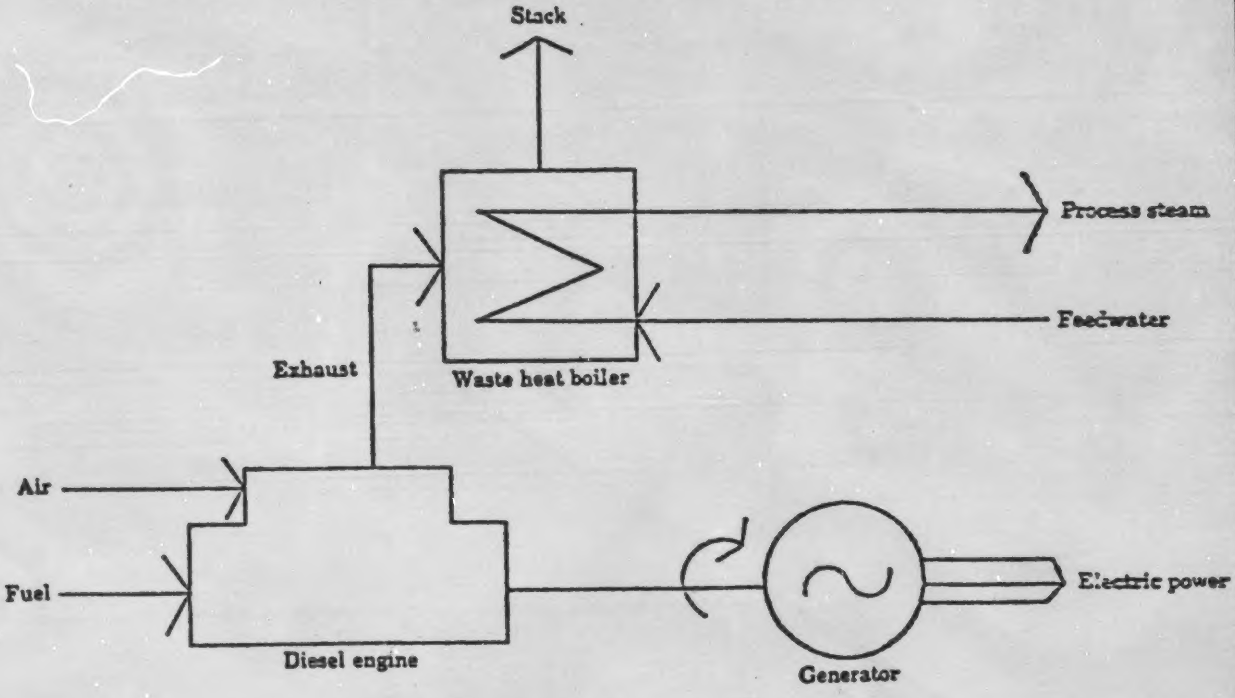
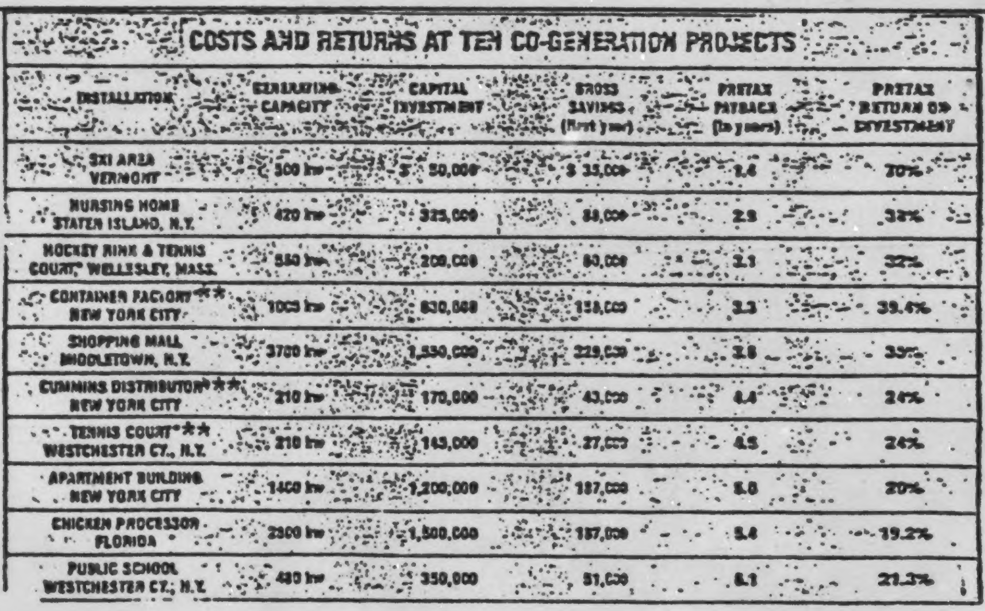
Diesel Cogeneration

Figure #5

Source: "Cogeneration: Its Benefits to New England"
Final Report of the Governor's Commission on Cogeneration





COSTS AND RETURNS AT TEN CO-GENERATION PROJECTS

INSTALLATION	GENERATING CAPACITY	CAPITAL INVESTMENT	GROSS SAVINGS (first year)	PRETAX PAYBACK (in years)	PRETAX RETURN ON INVESTMENT
SKI AREA VERMONT	300 kw	$ 50,000	$ 35,000	1.4	70%
NURSING HOME STATEN ISLAND, N.Y.	420 kw	325,000	88,000	2.9	34%
HOCKEY RINK & TENNIS COURT, WELLESLEY, MASS.	550 kw	200,000	90,000	2.1	32%
CONTAINER FACTORY** NEW YORK CITY	1000 kw	630,000	158,000	3.3	39.4%
SHOPPING MALL MIDDLETOWN, N.Y.	3700 kw	1,550,000	229,000	3.8	35%
CUMMINS DISTRIBUTOR** NEW YORK CITY	210 kw	170,000	43,000	4.4	24%
TENNIS COURT** WESTCHESTER CY., N.Y.	210 kw	143,000	27,000	4.5	24%
APARTMENT BUILDING NEW YORK CITY	1400 kw	1,200,000	187,000	5.0	20%
CHICKEN PROCESSOR FLORIDA	2300 kw	1,500,000	187,000	5.4	19.2%
PUBLIC SCHOOL WESTCHESTER CY., N.Y.	480 kw	350,000	51,000	6.1	21.3%

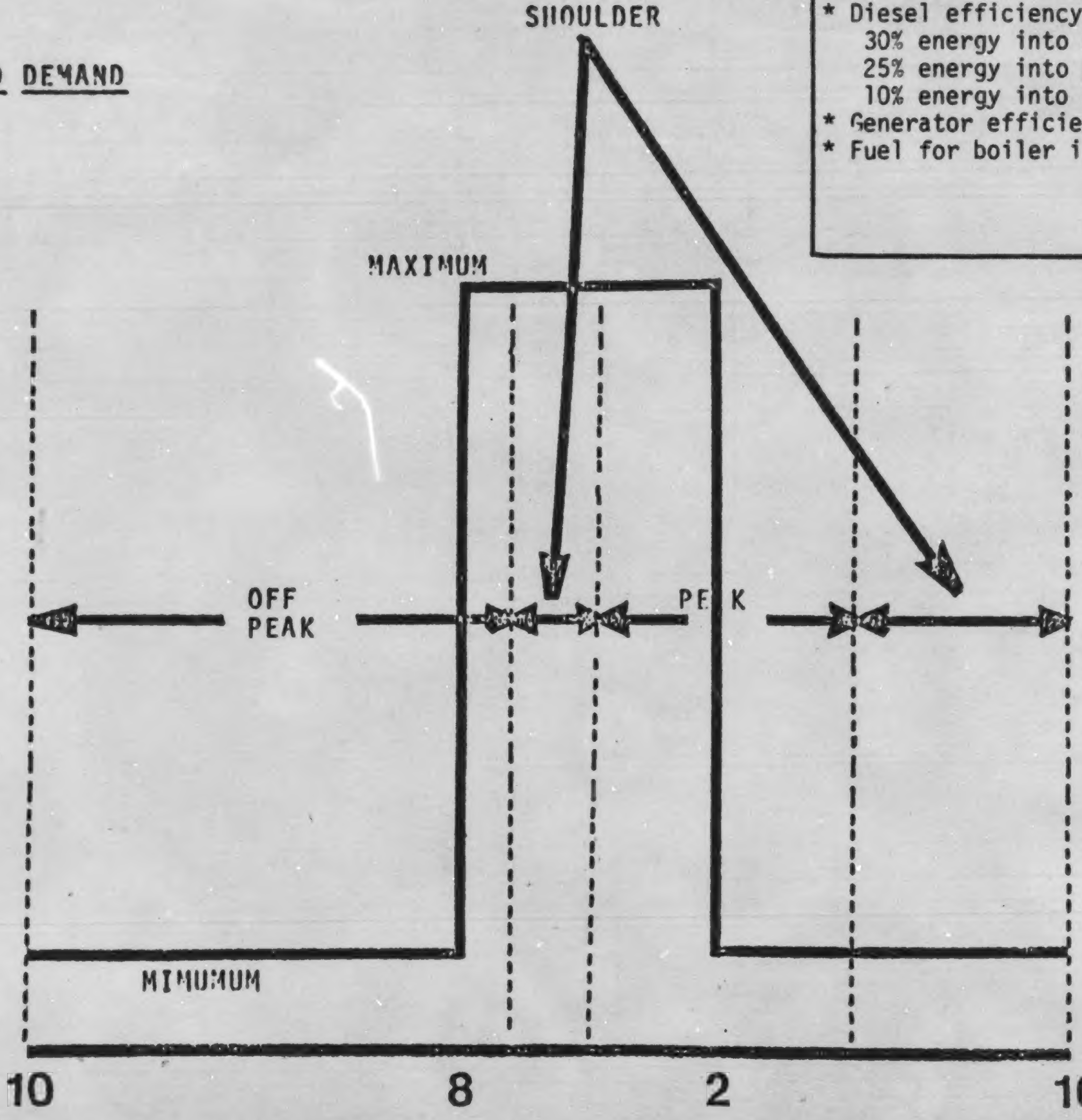
** Plants under construction or operating. The others await final approval. (Data compiled by Cummins Cogeneration Company.)

Taken from: "The Little Engine That Scares Con Ed"
Fortune, December 31, 1978

Figure #6

Figure #7

DAILY OCCUPIED DEMAND



ASSUMPTIONS

* 200 kw shaved off from 8:00 to 2:00 p.m.
* Diesel generator maintenance costs 6mls/hr
* Diesel fuel costs are 45¢/gallon
* Boiler efficiency is 75%
* Diesel efficiency is 35%
  30% energy into cooling water (100% conv.)
  25% energy into exhaust (30% conversion)
  10% energy into radiation
* Generator efficiency is 90%
* Fuel for boiler is 45¢/gallon

Figure #8

Results without Heat Exchangers

. Electrical Saving	$1,610/month
. Diesel Fuel Costs	$623/month
. General Maintenance Costs	$170/month

NET SAVINGS PER MONTH: $817.00

Results with Engine Block and Exhaust Recovery Units

Savings would be: $420/month

(Does not include cost of recovery units.)

Figure #9

FUTURE TASKS******

*COMPUTER ENERGY MANAGEMENT SYSTEM

(in the process of capturing
selection process)

*IMPLEMENT PEAK SHAVING

*FEASIBILITY OF TOTAL ENERGY SYSTEM

*DEVELOP NEW CURRICULUM

A) Alternative Energy Systems
B) Energy Conservation Analysis
C) Building Energy Control Systems
D) Building Operations and Maintenance

******FUTURE TASKS

Figure #10

SUMMARY

All of the above will be integrated into a computer control energy management system. We are in the process of discussing with vendors our requirements and needs for installation of a computer control system. (See Figure #10 for future tasks.)

In the final phase, the objective will be adding the following courses into the Wentworth curricula.

1. Energy Conservation Analyses Course
2. Building Operations and Maintenance Course
3. Building Energy Control Systems
4. Alternative Energy Systems Course

Instructional Cost Analysis at a Small College

William W. Watts

The King's College

Most applications of instructional cost analysis have relied heavily upon sophisticated computer systems and a high degree of specialized personnel support. It is tempting to conclude that such studies are beyond the reach of a small institution.

Attempts to develop an ongoing program for instructional cost analysis at The King's College have proved successful. It is both possible and desirable to perform these studies at a college of our size.

The King's College, founded in 1938, is an evangelical liberal arts college located in the suburban community of Briarcliff Manor, New York. The College is a four year coeducational institution with 90% of the students resident on campus as full-time students. The current student body numbers 870.

The institutional mission is abbreviated by four broad purposes: a liberal arts foundation; an integrated, interdisciplinary Christian world view; students' development as whole persons; students' commitment to God and service to others. This mission is further articulated by a carefully stated "Philosophy of Education". The latter statement serves as basis for twelve "Goals for the student".

Academic curriculum planning is done in light of the Goals for the Student. Each goal finds expression in some course-related experiences. In particular, the Core Curriculum is closely linked, point-by-point, with the Goals for the Student.

The Core Curriculum accounts for 53 of the 130 credits required for graduation. Of these 53, 32 credits are for specific courses. Students have some degree of choice in the remaining 21 credits. The Core includes 9 credits of interdepartmental courses, with the bulk of the core representing courses taught along standard departmental lines.

In addition to the Core Curriculum, students must complete from 30 to 72 credits in major and related requirements. The College offers 10 majors with the B.A. degree and 6 majors with the B.S. degree. Although a small program, an A.A. degree is also available. In May 1979, there were 86 B.S. graduates, 68 B.A. graduates and 8 in the A.A. category. Our five largest majors are Business, Physical Education, Elementary Education, Biology, and Psychology.

Seeing the need for more systematic approaches to data collection, analysis, and dissemination, the College began an institutional research function in 1975. With some reorganization of personnel, the new Registrar also became the first Director of Institutional Research.

Activity in institutional research began in June 1976, when the College was invited to participate as a pilot institution in the Instructional Cost module of a project sponsored by the Council for the Advancement of Small Colleges (CASC). The overall project has evolved into CASC's Planning and Data System (PDS).

It is by virtue of membership in CASC that King's became eligible for a U.S. Office of Education Title III grant for Institutional Development. The College, along with 51 other institutions (of the total of 217 CASC Colleges) is now in the fourth and last year of this Federally funded project. The 52-member Small College Consortium provides technical assistance in: planning, management information systems, and fiscal management; marketing, admissions/recruitment, attrition/retention, and financial resource development; curriculum, career, and student development; faculty development and evaluation, administrator development and evaluation, and organizational development. Under the sponsorship of this project, we have generated such items as market studies, retention studies, a Factbook, an advising manual, student life surveys, a goals study and instructional cost analysis.

Our first Instructional Cost Analysis was begun in June 1976, for the 1975-76 academic year. Supporting funds were provided by the Institutional Development Project. At the time, our student records were all in manual form, with the result that much time was spent in coding the course information for keypunching on campus. Data were processed at Drake University using NCHEMS software. Our involvement in the CASC project cost us approximately $700.00 for on-campus expenses. Computer processing and consultation were provided without charge from CASC.

The CASC project gave us student data reports, personnel data reports, direct costs per credit and full costs per credit. Our involvement in this project covered the months of June 1976 through March 1977, a period of ten months.

During the 1976-77 year, the College also used Institutional Development funds to automate student records. Every effort was made to have data elements compatible with NCHEMS input formats, for purposes of future cost studies.

During this same time period, the College was invited to participate in an Institutional Information System project, sponsored by the New York

State Department of Education's Office of Postsecondary Research, Information Systems and Institutional Aid.

From the time of our first meeting with the technical consultant provided by the State, we spent about nine months to complete the three modules of the project: the Student Data Module (SDM), the Personnel Data Module (PDM), and the Accounts Crossover Module (ACM). We estimate that $500.00 was spent for keypunching time, cards, shipping, telephone and various labor costs. Personnel time, which was not included in this amount, is estimated at three to four person-weeks.

It should be noted that the State project marked our second year of an NCHEMS-type study. Thus, some of our time and costs were reduced by having had previous experience with the modules, and by having developed a student records system which is compatible with NCHEMS formats.

During the course of our involvement in the State Education project, we were able to obtain software, through our computer company's users group, which was designed to perform the same type of analysis. For a modest cost of $50.00, we secured three programs from the GUAGE users group.

The College owns a General Automation 18/30 computer. The CPU contains 16 Kilobytes of main memory and operates under a Disk Management System. The peripherals include two disk drives, which handle 5 megabyte removable disk packs, and a 400 card-per-minute printer. Data input is provided by two keypunch units in the computer room.

Using the GUAGE program for the Induced Course Load Matrix (ICLM), we generated reports similar to those provided by the NCHEMS Student Data Module. Since this first on-campus study covered the same year as did that sponsored by the Education Department, we were able to compare results.

The comparisons were quite favorable, giving us confidence to continue conducting the analyses on campus.

During the 1977-78 year, our Computer Director rewrote the ICLM program so that now the ICLM reports are routinely generated by virtually no data input, using student records files which have already been mounted by the Registrar's Office. Cost data, in the form of direct cost per credit hour, are determined by manual computations. We are currently developing programs to analyze faculty and accounting data, thereby eliminating most of the remaining manual procedures.

Three types of reports are generated by our ICLM program. Table I shows the Induced Course Load Matrix. One such page is generated for each teaching department. Column 1 lists the names of all majors taking courses in the department. Column 2 indicates the average number of credits taken by that major, in the department, by an FTE student, where an FTE student is defined as having 30 semester hours. Column 3 indicates the FTE enrollment. This is found by taking the total credits consumed, across all departments, by students in this major, and dividing by 30. The FTE ENRL number is therefore constant for a given major, regardless of the department reported on the ICLM page.

Column 4, the IWLM, represents the total credits taught by the department listed at the top of the page, to the given major. An important relationship to note is that:

$$\text{ICLM} = \text{IWLM} \div \text{FTE ENRL}$$

Column 5 gives the percent of the department's credits taught to the major on that line. The last column reports the per cent of the total credits taken by the given major which are in this department. Column 5 should add

TABLE I

INDUCED COURSE LOAD MATRIX SYSTEM

Department #17

Major	ICLM	FTE ENRL	IWLM	Percent Dept	Percent Major
	2.14	1.40	3.00	.41	7.14
1	.68	145.10	99.00	13.58	2.27
2	1.22	29.40	36.00	4.94	4.08
3	.64	70.52	45.00	6.17	2.13
4	.76	11.90	9.00	1.23	2.52
5	.69	86.60	60.00	8.23	2.37
6	1.10	40.88	45.00	6.17	3.67
7	.79	56.67	45.00	6.17	2.65
8	.56	31.92	18.00	2.47	1.88
9	.52	5.82	3.00	.41	1.72
10	54	55.78	30.00	4.12	1.79
11	2.86	1.05	3.00	.41	9.52
12	.74	12.18	9.00	1.23	2.46
13	1.83	3.28	6.00	.82	6.09
14	.68	8.88	6.00	.82	2.25
15	.50	5.77	3.00	.41	1.73
16	.35	102.30	36.00	4.94	1.17
17	10.00	3.30	33.00	4.53	33.33
18	1.19	25.17	30.00	4.12	3.97
19	1.45	68.15	99.00	13.58	4.84
20	.87	13.73	12.00	1.65	2.91
21	1.78	21.87	39.00	5.35	5.95
22	.77	27.13	21.00	2.88	2.58
23	1.27	2.37	3.00	.41	4.23
24	.85	35.27	30.00	4.12	2.84
TOTALS	34.78	866.44	723.00	99.17	116.09

INDUCED COURSE LOAD MATRIX SYSTEM

Department #5

Major	ICLM	FTE ENRL	IWLM	Percent Dept	Percent Major
5	8.45	86.60	731.50	91.04	28.16
6	.07	40.88	3.00	.37	.24
7	.05	56.67	3.00	.37	.18
13	7.01	3.28	23.00	2.86	23.35
19	.51	68.15	35.00	4.36	1.71
TOTALS	16.09	255.58	795.50	99.00	53.64

to 100%, but column 6, in general, will not.

Table II gives a report of the number of student credits taught by each department. Table III reports the number of student credits taken by each major. Data from these two tables serve as inputs to the next phase of analysis, computation of direct cost per credit hour.

The College is currently interested in direct costs only. Direct cost per credit hour is determined for teaching departments by a manual procedure which uses a simple worksheet for performing calculations. The total direct cost for a department consists of faculty salaries, fringe benefits, and the remainder of departmental expenses, as reported on the general ledger of the College. Where a faculty member's load is spread across more than one department, the salary and fringe benefits are allocated in proportion to the respective teaching loads in each department. In cases where an account on the ledger includes more that one teaching department, non-personnel expenses are allocated to the departments in proportion to the number of student credits taught by each one. (When we do the analysis by upper and lower division, similar allocations are performed.)

The direct cost per credit hour for a teaching department is found by dividing the direct cost (as determined according to the previous paragraph) by the total number of credits taught. In a formula:

$$\text{Cost per credit} = \frac{\text{Allocated Compensation + Allocated Expenses}}{\text{Total Credits}}$$

where compensation equals salary plus fringe benefits.

At present, we have accumulated credit information for the past four academic years and cost information for the first three of these years. The data are included in the College's Factbook. These reports give an overview of trends and comparisons among departments and majors.

TABLE II
Credit by Dept-1978-79

DEPARTMENT	STUDENT CREDITS
1	1440.00
2	3859.00
3	1449.00
4	645.00
25	882.00
26	255.00
5	803.50
6	3315.00
27	411.00
12	234.00
28	6.00
29	325.00
30	168.00
31	171.00
7	1479.00
32	552.00
33	105.00
8	1052.00
10	1464.50
16	2211.00
17	729.00
34	244.00
35	153.00
19	2415.00
21	285.00
36	135.00
22	1094.00
13	301.00
37	32.00
	26215.00

TABLE III
CREDIT BY MAJOR-1978-79

Major	Student Credits
1	4384.0
2	882.0
3	2115.5
4	422.0
5	2628.0
6	1226.5
7	1700.0
8	957.5
9	174.5
10	1707.5
11	31.5
12	365.5
13	98.5
14	266.5
15	173.0
16	3097.5
17	99.0
18	755.0
19	2044.5
20	412.0
21	656.0
22	814.0
23	71.0
24	1133.0
	26214.50

During this year, we will be developing a Departmental Profile form, on which will be included a four year report of credits taught, number of majors, number of graduates, number of credits consumed by majors, cost per credit hour, and average section size.

* * * * * * *

There are several important lessons that we believe we have learned from our participation in cost analysis procedures:

1.) Success is highly dependent upon top-level administrative support. Since the coordinator of this project must gather data from several offices, (s)he must have ready access to the data required and have assurance of the consistency of interrelated items.

2.) The process is as important as the results. The NCHEMS procedures have helped us to establish a better informational system, both in student records and in other areas where inconsistencies of data were brought to light, through the process.

3.) External assistance is highly desirable for initiating the system; subsequent years' analyses can be performed much more inexpensively, rapidly, and accurately. The CASC Planning and Data System Module on Instructional Cost Analysis offers this type of initial experience for the small college (CASC, 1979).

4.) A small college should be selective in its use of the very sophisticated set of NCHEMS options. The flexibility of the NCHEMS software is both valuable and overwhelming. We have used only a small portion of its capabilities. We have found the ICLM (or SDM) data to be most useful. For cost figures, we have calculated direct costs, and not full costs. The upper/lower division distinction has not been used. The amount of effort required to do the Accounts Crossover Module and the Data Management Module electronically is much greater than we can justify. Manual calculations provide the financial results of interest to us. We have not attempted to do the Resource Requirement Prediction Model.

5.) The small college must recognize those constraints which limit the usefulness of the results. The small college, at least in New York State, is constrained by the State Education Department's expectation that there be a minimum number of faculty and PhD's within a department in order to sustain a major.

The small college is often characterized by a strong sense of community and a firm commitment to a set of well-defined goals. It cannot be all things to all people, nor can it make decisions purely on economic grounds. In a large university, a move to decrease costs may produce an imperceptible ripple effect; at the small college, the same magnitude of change may destroy a program or move the institution away from its mission.

6.) Comparative data are interesting, but not very useful. We have been fortunate to find data from a group of colleges reasonably similar to ours. In a general sense, we found our cost figures to be comparable to theirs. However, because there are so many differences in geographic economics, academic programs, accounting systems, and data collection procedures, we have found it impossible to use any such comparative data for decision-making purposes. Our most helpful comparisons have been those among departments at our own institution as well as trend analyses.

7.) The most appropriate approach to cost study data is "soft management" rather than "hard management". (Bacchetti, 1977, pp. 5,6.) The data do not make academic program decisions for us. There are no formulae for which the numbers can crank out decisions for dropping or trimming programs. Rather, the data, when viewed over several years across departments, can be inputs to departmental profiles, which assist us in making better decisions than we could make without the data.

8.) Instructional cost analysis should be but one element of a comprehensive, integrated approach to institutional research and development. By itself, such a study is limited in scope and usefulness, because it ignores so much about the institution.

* * * * * * * * * *

Given these eight lessons learned, there are certain questions for which instructional cost data can help us find answers:

1.) A department asks to increase the number of its faculty. Should we increase (or decrease)?

2.) Which departments are showing declining interest? (For majors? for non-majors?)

3.) A department asks for more physical space. Is the request justifiable?

4.) A department argues for a sizeable budget increase. On what basis can the increase be approved (or denied)?

5.) Can budget dollars be freed for other purposes by adjusting the mix of part-time and full-time instructors in a given department?

6.) What departments seem to be overworked? Can these be identified and helped?

CONCLUSION

As with other colleges, we recognize that the whole area of instructional cost analysis is evolving, and that new applications are developing with time. At the King's College, we have found that instructional cost analysis is within the reach of a small college. As an exercise in institutional research, the analysis has been successfully executed within the constraints of our financial and personnel resources. We have found that it is both possible and worthwhile to do instructional cost analysis at a small college.

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CREATIVE CHANGE THROUGH COOPERATION
The Maryland Community College Research Group: A Cooperative Approach that Enhances Effective Community College Institutional Research in Maryland

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Overview. Although the main title of our presentation is "Creative Change Through Cooperation," the subtitle is "The Maryland Community College Research Group: A Cooperative Approach that Enhances Effective Community College Institutional Research in Maryland." Our presentation consists of two parts, both of which describe aspects of the Maryland Community College Research Group (MCCRG). The first part describes the MCCRG with a special emphasis placed on the role it plays in fostering community college institutional research in Maryland. The second part of our presentation details two recently completed studies conducted via the assistance of the MCCRG. One of these studies was of all 1978 community college graduates in Maryland. The other was of employers of these 1978 community college graduates. Of particular interest to most of us today is the new Vocational Education Data System or "VEDS." As my co-presentor will relate shortly, these two studies provide much of the information needed for the VEDS.

The Maryland Community College Research Group. Maryland is atypical among the fifty states in that it has a high degree of coordination and an effective communication network established at the public community college level. As one illustration of this, in Maryland, there are statewide organizations that consist of each of the major administrative officers at the two-year college level. These groups include the presidents, academic deans, occupational deans, public relations officers, data processing directors, business officers, and institutional research directors. Of this great multitude of organizations, two of the most active and respected of these groups are the Council for Community College Presidents and the Maryland Community College Research Group.

Organized nine years ago, the Maryland Community College Research Group (MCCRG) is an effective forum for promoting the effective use of community college institutional research in Maryland. The MCCRG consists of the institutional research directors/personnel of the 17 public community colleges in Maryland, the Director of Planning and Research of the Maryland State Board for Community Colleges (the coordinating agency for the locally governed community colleges), and other professional staff of Maryland community colleges and agencies. The MCCRG meets about eight times a year hosted by one of the community colleges.

Any professional association usually has among its purposes for establishment the following:

(1) to provide channels of communication among the members, including a forum for the interchange of ideas about new techniques, strategies, and methodologies;

(2) to encourage the growth and maturation of the profession; and

(3) to offer a program of interest that will lead to an expansion of the professional's knowledge and hopefully lead itself to relevant decision-making for the more effective and/or efficient operation of the professional's institution.

The wider the scope of the organization, the more expanded role it plays.

In terms of the profession of institutional research, the Association for Institutional Research provides a national organization along with the American Education Research Association. Regional organizations are multitudinous, including the North East Association for Institutional Research, founded in December, 1974. These organizations are important, productive, and provide the practicing professional with the opportunity to discuss, seek assistance, and share information regarding their common problems and issues.

However, a great number of problems and issues differ drastically from region to region, and from state to state. Even within a state, the problems of one level of higher education (i.e., the state colleges) may be fairly different from the concerns at another level (i.e., the community colleges). Therefore, these problems and issues are best addressed in an organization that is composed of those individuals and institutions of similar type within a state. The MCCRG is such an organization in Maryland.

The MCCRG has two major areas of emphasis:

(1) providing a forum to explore and research pertinent statewide and national issues relevant to the community colleges in Maryland; and

(2) establishing and fostering inter-institutional research activities among the community colleges in Maryland.

In regard to the first point above, at present one of the great concerns in Maryland is the community college funding formula. During the past year, members of the MCCRG carefully studied the problem, reviewed various proposed alternatives, and drafted a comprehensive document that was forwarded to the Maryland State Board for Community Colleges and each of the community college presidents in Maryland. It will surely have an impact on the final funding formula (although that formula is still being developed and reviewed). Maryland is one of the only community colleges in the United States with a comprehensive community college evaluation system. Originated by members of the State Board for Community Colleges, members of the MCCRG provided assistance in its development, and provide all of the data that make the system possible. A third issue of concern on the national front is the Vocational Education Data System. After study of this issue, the MCCRG endorsed a detailed response to this system that was subsequently adopted by the Maryland State Board for Community Colleges as an official position.

Although a coordinated approach to state and national issues has strengthened the role of institutional research in Maryland, there can be little doubt that the communication network established via the MCCRG has greatly fostered inter-institutional research activities in Maryland. The formal organization of the MCCRG provides a means to coordinate studies that involve all of the 17 community colleges in Maryland. Through the informal organization, numerous research studies that involve a number of these institutions take place continuously. There is no doubt that the MCCRG has fostered a stronger institutional research program at each community college in Maryland, including Allegany Community College. Its impact on decision-making at all levels, and especially at the level of the President's Council and the Board of Trustees at Allegany, has been significant. Having 17 institutions as resources for whatever issue or concern is applicable to Allegany is a tremendous advantage in the carrying out of responsibilities in the areas of institutional research and planning.

At least once a year, part of the MCCRG is devoted to a report by each member as to present and projected research activities. These sessions inevitably lead to requests for completed studies, and cooperative approaches to common areas of identified need. It is rare for any institution to be confronted with a problem or issue that one of the other sixteen institutions of similar type have not faced in the recent past or will also be facing in the near future. This information sharing allows institutions to review other approaches to the problem, save the futility of "re-inventing the wheel," and often allows for direct replication of studies and approaches. Among the areas in which institutions have worked together within the past three years have been:

- the development of an administrative evaluation system
- a study of outcomes of a community college education
- an assessment of attrition/retention at Maryland community colleges
- the future of the community college in both Maryland and in the U.S.
- a study of "per-credit hour" tuition policies

The advantages that are associated with a statewide organization for institutional research among institutions of the same type, as evidenced by the Maryland Community College Research Group in Maryland, are that the organization provides:

(1) an effective forum to address statewide and national issues;

(2) a means to foster inter-institutional research among institutions of the same type;

(3) a forum for the interchange of ideas and research, most of which is directly related to the practical day-to-day decision-making of each college; and

(4) a greater appreciation for the profession of institutional research and its impact on both institutional and statewide decision-making.

This added dimension to institutional research that the MCCRG provides Allegany, among other community colleges in Maryland, is the valuable contribution that I relate to you today. In my opinion, organizations like the MCCRG that are conducive to practical decision-making are as essential to an effective institutional research operation as national and regional forums that of necessity direct themselves to a larger scope.

If your state does not have an institutional research organization that caters to the special needs of your type of institution, and these words sound appealing, I hope to have planted a seed or two today. The MCCRG started back in 1970 by a telephone call, a small meeting of three institutions, and a goal: to establish an effective association of institutional research on the community college level in Maryland and to foster a cooperative spirit to institutional research. This is usually how all such associations started including NEAIR. Today, as the ninth Chairperson of the MCCRG, I feel that this goal has been and continues to be achieved.

Two Recent Projects. The Maryland Community College Research Group and the State Board for Community Colleges (State Board) have cooperated on several projects during the past four years. There are several advantages to a system of state-local cooperation in research. First, the studies are often improved through the interaction involved. For example, the experience of each college in constructing questionnaires can lead to a better instrument. Second, a better response rate can usually be achieved with a local appeal in the cover letter. Third, use of a common instrument enables colleges to compare their results with the state average for each item. In fact, several colleges have requested cohort college printouts, so that a large college can compare its results with colleges of similar size. Two of the most recent projects were the graduate follow-up study and the employer follow-up study.

Graduate follow-up. The primary purpose of the study was to help the colleges and the State Board evaluate the extent to which they are helping students to achieve their educational goals. The study also provided data for the State Board's Program Data Monitoring System (a program evaluation system) and for the Vocational Education Data System. Questionnaires were designed by the Maryland Community College Research Group, and were printed by the State Board. Each college added its own cover letter and mailed the questionnaires to its graduates. In March, 1979, questionnaires were sent to 6,975 graduates of fiscal year 1978, and 4,223 responses were received, for a response rate of 61 percent. Computer analysis was done by the State Board, and college and statewide printouts were distributed to each institution.

The most frequent educational goal of the graduates was career development (39 percent), followed by preparation for transfer (32 percent). The remainder were interested in exploration of a new career or self-enrichment. Eighty-five percent of the graduates said that they achieved their goal, with significantly higher rates of goal achievement for women and whites. The study asked why persons attended the community college, and surprisingly, low cost was not among the top two reasons selected. The graduates checked convenient location and attractive programs most often (34 percent checking each item).

About three-fourths of the graduates were employed, 56 percent full-time and 21 percent part-time. However, among graduates who had employment goals, 75 percent were employed full-time. There were no significant differences by sex or race in employment goal achievement. Four-fifths of the graduates were employed in a job that was related to their program of study, and 92 percent stayed in Maryland or the District of Columbia for their employment. Several questions were asked of the graduates who were still looking for work. Most respondents said that there were too few openings in their field, but interestingly, only three percent said that the salary was too low in their field.

About 40 percent of the graduates did some transfer work at a four-year college. However, among graduates who had transfer goals, three-fourths transferred. There were no significant differences by sex or race in transfer goal achievement. Most students selected a transfer college in Maryland, and most of those chose a state-operated institution. The majority of transfer students lost three credits or less in the transfer process, and earned a 'B' or better average at the transfer college.

In the community college, a study of the graduates is a study of the academic success of the college. The results are positive, giving excellent reinforcement to the faculty and beautiful material for press releases. These two uses are important and legitimate. However, the graduate follow-up also provides detailed information by program that can stimulate critical program evaluation, and the data is being used in Maryland for this purpose as well.

Employer follow-up. The purpose of the employer follow-up is to help colleges improve their occupational programs. The study also provides data needed for the Vocational Education Data System (VEDS). Questionnaires for the employer follow-up were designed by the Maryland Community College Research Group, and included the five items specifically required by VEDS. The questionnaires were printed by the State Board and mailed by the colleges. The names and addresses of employers were derived from the graduate follow-up study, and the population consisted of the employers of students who graduated from career programs, were employed full-time in a field related to their training, and who gave permission to contact their employer. Questionnaires were sent to 962 employers, and 784 responses were received, for a response rate of 81 percent. Computer analysis was done by the State Board, and college and statewide printouts were distributed to each institution. The completed questionnaires were returned to the colleges, and sent to the faculty in each occupational program to read the open-ended responses.

Employers gave the highest ratings for interpersonal skills, such as the ability to communicate with superiors and the ability to work well with others. On the former item, 60 percent said that the preparation was more than adequate and only 2 percent said inadequate. The programs with the highest ratings in ability to work well with others were Secretarial and Fire Science, and programs with lowest ratings were Electronics and Radiology.

The item consistently rated lowest by employers was familiarity with test or laboratory equipment, where 27 percent said that the preparation was more than adequate and 9 percent said inadequate. On this item, Secretarial Science and Law Enforcement programs were rated highest, and Electronics and Nursing were rated lowest.

Employers rated the performance of job skills somewhere between interpersonal skills and familiarity with equipment, with 40 percent saying that job skills were more than adequate, and only 6 percent saying inadequate. Secretarial Science and Business programs were rated highest on the performance of job skills, and Nursing and Data Processing were rated lowest.

In general, the results are seen as a clear endorsement of the career programs in Maryland's community colleges. Ninety-seven percent of the employers said they would hire another graduate from the same program. The central problem with the study is the small number of responses for each program. Of 77 programs, only 15 had more than 10 respondents statewide. Such numbers are predictable with the small study population; after the study has been conducted for several years, the responses by program can be aggregated to improve the data. For the present, the best use of the employer follow-up may come through the personal review of the open-ended questions by the faculty at each community college.

Summary. It may be easier for a single college to do institutional research projects on its own. It may be easier for a state agency to mandate that all colleges conduct a cookbook study. While more time and effort may be required to conduct state coordinated institutional research, the rewards can be great. The data may be cleaner, and the study will certainly provide more comparative information. The statewide analysis can play an important role in policy formation at the state level.

The graduate and employer follow-up studies, conducted on a regular basis, are excellent for complying with the VEDS, and they are impressive on a campus about to encounter an accreditation visit. However, the primary reason for a comprehensive statewide follow-up system is to improve the quality of education for the student. Beyond all the tables and chi-squares, if the faculty member teaching data processing is stimulated to take another look at the course and make some changes, then all of the questionnaires and computer runs are worth it. A statewide follow-up system, with colleges and a state agency cooperating, has been an effective part of program evaluation and improvement in Maryland.

STRATEGIC LONG RANGE PLANNING FOR UNIVERSITIES

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Introduction

The multiple and often broad-based objectives of a college or university make strategic planning a particular challenge. This paper represents the results of thinking about and doing strategic long range planning at Carnegie-Mellon University (CMU). A structure for strategic planning analysis is presented which integrates existing techniques. Examples are provided of planning activities at CMU. The following sections of this paper will discuss the definition of strategic planning, strategic planning anlysis, a university planning process, a strategic planning framework, examples of strategic planning, and conclusions about this field.

Definition of Strategic Planning

Planning is the process of preparing for the future. Strategic planning involves those decisions which are of major importance to an organization. Strategic issues are visible, global and significant.[1] Examples of strategic issues for a university are tuition, faculty and staff salaries, size and quality of freshman class, departmental budgets and tenure quotas. Strategic decisions usually involve questions of generating and allocating resources.

Strategic planning, as with any planning, cannot be done successfully in a vacuum. Defining a context for planning is especially important for strategic issues. One framework for defining a context is the WOTS-UP method.[2] The acronym stands for weaknesses, opportunities, threats and strengths. The following examples show the types of issues that would be included in this strategic planning framework at Carnegie-Mellon.

Strengths:	Faculty productivity and student quality.
Weaknesses:	Age, condition and suitability of physical space; geographic distribution of entering students.
Opportunities:	Growth in sponsored research; strong demand for professional education.
Threats:	Increased inflation and decline in numbers of high school graduates.

Robert Shirley has presented a similar framework for strategic planning.[3] Many other frameworks also exist. The main point is to use some framework to insure that the kind of issues mentioned above will be included in planning.

After strategic issues have been identified and plans are being made, it is useful to check for constraints or interactions among strategic areas. The existence of these interactions reinforces the importance of setting up a global or systems view of an institution and its environment for strategic planning. Once a strategic framework has been developed the rest of the planning process can begin.

Strategic Planning Analysis

A strategic planning analysis[4] is the next step after the strategic planning framework has been developed and the appropriate information collected. A strategic planning analysis should answer the questions: "Where are the institution's competitive advantages and therefore where should a greater portion of resources be placed?"

The concept is to strengthen the university by emphasizing programs which have (or are expected to have) comparative advantages. The need for strategic planning is well stated by Fred Harcleroad, "No college or university, private or public, now has or can hope to have the resources needed to do everything well. An insitution will have to decide whether to do a few things well or many things poorly."[5]

The Boston Consulting Group (BCG) has developed a method of strategic analysis called the "product market matrix".[6] In its simplest form the matrix has two dimensions: market share and expected market growth. This simple, but powerful analysis works well for the private sector where profits are usually related to market share. To maximize profits a firm therefore concentrates on products with high market share in growing markets and cuts back on products with low market share in declining markets.

Certainly a more complex analysis is needed for universities. As a public sector organization there are multiple goals which can't be captured with a single "bottom line". Peter Doyle and James Lynch made the first extension of the BCG matrix for a university. They used the dimensions of market share and market size.[7] This author feels that this adaptation is inappropriate since market growth is a better determinant of strategic importance than market size is.

James Hollowood[8] has made another adaptation of the BCG matrix for universities. Hollowood's matrix has the dimensions of market share and the maturity of a field. Hollowood argues that market growth is a function of the maturity of a field. The notion of maturity of a field is an important concept but it is not a substantial change from the basic market share and market growth matrix.

Lawless, Levi, and Wright[9] provided this author with the idea of the missing dimensions from a strategic analysis for universities. They argued that program quality and the centrality of each program to the university's mission were important dimensions. This author feels that a synthesis of BCG's market share and market growth approach and Lawless et al's quality and centrality dimensions is an appropriate basis for university strategic planning analysis.

The importance of market share and market growth has already been discussed with their obvious economic impact. Program quality and centrality are important because of the nature of universities. Quality is important for two reasons. First, in many student choice and research funding decisions, quality is a primary factor. Second, it is important for a university to have a relatively uniform level of quality. Centrality is important because of the interdependence of academic fields in terms of teaching and research. Carnegie-Mellon, for example, would be handicapped without a strong mathematics department.

Given the four-dimensional analysis posed by the author, an institution could put relatively more resources in high market share, high market growth, high quality and central academic programs. The Computer Science Department at Carnegie-Mellon is an example of such a program. In fact, the success of this department was the result of a strategic decision made years ago. Conversely, a university would put relatively fewer resources in lower market share, lower (or negative) market growth, lower quality and less central academic programs.

Figure 1 shows an example matrix for Carnegie-Mellon with two of the four strategic analysis dimensions.

Figure 1

Product-Market Matrix

CMU Example Departments

Market Academic Ranking (Quality)

	HIGH RANKING	NOT RANKED
GROWING AREA	CHEMICAL ENGINEERING• COMPUTER SCIENCE• MANAGEMENT•	SOCIAL SCIENCES BIOLOGY
STABLE OR DECLINING	PHYSICS DRAMA	MODERN LANGUAGES

It should be noted that although the creation of a strategic planning analysis is relatively straightforward, its application to decision-making is not. First, as with any analysis, strategies are suggested to decision-makers rather than determined by the analysis. The decision-makers will always need to use their judgment in taking action, especially since they are aware of complexities which the model can't take into account. Second, the amount of change in resource allocation will always be constrained by a university's situation. Tenured faculty cannot be dismissed without great disruption for an institution or facilities may not be easily converted from one purpose to another. Third, many strategic decisions at Carnegie-Mellon have not been at the level of emphasizing field A versus field B but instead at questions of which subspecialties within fields should be emphasized. And finally, all major decisions will be implemented through regular organization processes. The next section of this paper will discuss an example of a university planning process which focuses on strategic issues.

A University Strategic Planning Process

There are three important issues in conducting strategic planning: it must be done periodically, it should be done in a common format for each subunit, and it should deal with strategic issues. Table 1 shows the basic college planning outline being used at Carnegie-Mellon. The CMU planning process will occur during the 1979-80 academic year. This planning will be the first major planning effort since 1976-77. The outline is designed to stress strategic planning concerns. The points addressed in the outline are expected to produce plans which can be compared and assimilated at the university level.

Table 1

College Planning Outline

1) Strategic Environment
    a) College goals statement
    b) External environment
    c) Strengths and weaknesses
    d) Internal relationships with other CMU units

2) Opportunities Analysis
    a) Specific areas with opportunities
    b) Pros and cons of each

3) Strategic Plan
    a) The college's recommended plan for utilizing the available alternatives should specify actions that will be taken as well as major alternatives that will *not* be adopted.
    b) Implementation

4) Evaluation Plan
    a) Assessing success of the strategic plan
    b) Means of tracking competitors

Another procedural issue is important in planning. At CMU the planning is top-down. The President sets the goals of the University and provides a framework for each college to conduct their planning. Bottom-up planning is an equally valid method. In either case there will be discussion and plan modifications once any planning takes place and people at a different level of the organization respond. And while CMU focuses on departments in strategic planning, institutional mission areas are another basis for structuring planning efforts.[10] The next sections of this paper will discuss some specific strategic planning examples at Carnegie-Mellon.

Budget Planning

A major issue in budgeting is how to integrate information about academic departments and how to translate that into budget decisions.

Although definitive procedures have not been developed, Carnegie-Mellon has had some useful experiences concerning these issues.

In planning the CMU 1980-81 budget in September, 1979, departmental indicators were used to present summary information. Table 2 lists these indicators. In each case the indicator was not presented in basic units of data such as dollars or units taught, but were converted to quintiles. The budget indicators were included to represent past strategic decisions. The research and units taught trend indicators measure market change. Research overhead recovered addresses research productivity and budget need. Units taught outside own department is a measure of teaching centrality. Finally, the income analysis supplement is a composite measure which is a proxy summary for teaching and research market share.

Table 2

Departmental Indicators Used In
Budget Planning

BUDGET
- Yearly Budget Increase % (5 year average, annualized)
- Last Year's Budget Increase %

RESEARCH
- Yearly Research Increase % (5 year average, annualized)
- Research Overhead Recovered per Faculty

TEACHING
- Yearly Units Taught Increase % (4 year average, annualized)
- Units Taught Last Year to Students Outside of Own College

COMPOSITE
- Academic Department Income Analysis Supplement %

81

The academic department income analysis is computed in the following way. Gross revenue is assigned on the basis of units taught and research overhead recovered. Charges are calculated for administration, library, computer center services, and assigned space. Net revenue is then gross revenue less charges. Then the supplement is the department's educational and general operating budget less their net revenue. The supplement basically measures the extent to which endowment income is used to support each department. Of course, care must be used in comparing departments. The physical sciences are usually much more expensive to support than the humanities, for example.

A delphi survey technique was then used by top university administrators to rate the budget priority of each department for 1980-81. After the second round of surveys, convergence was reached for over half the departments. More rounds were not completed because this process was only a guide to budget decisons, not a precise determinant, nor was it intended to be. In any system, top managers need to apply their judgments to the results of a planning process. In addition, at CMU budgets are given to deans who then decide departmental budgets. CMU's process is also top-down, starting with budgets based on expected revenues rather than with departmental lists of needs.

The result of this effort was a preliminary budget which was different at the college level from an across-the-board increase. On one hand, the difference from an even increase was only about half a percent of the funds allocated. On the other hand, 1980-81 is a year in which CMU plans to emphasize salary increases rather than departmental strategic importance. A rather different planning method was used in planning for the Planning Department.

Planning for the Planning Department

The experience during the summer of 1979 of planning for a Planning Department at Carnegie-Mellon was valuable for two reasons. First, it was a prototypical procedure for any strategic planning. The two major functions of planning were involved: the identification of a set of potential projects or activities and the selection of a subset of the initial group of projects which would be done. Second, a method was used to deal with the issue of a lack of an easily identified market share for the Planning Department's efforts.

The planning process began with three meetings at which all current proejcts and proposed projects were discussed. The discussions concentrated on explaining some of the projects, reviewing past effectiveness, and considering the organization environment in which the department operates. Next, dimensions of project value were created. Valuation was an important issue since Planning does not charge for its services nor is there a reasonable way of conceptualizing the market share Planning has of all planning projects at Carnegie-Mellon. The method used for valuation was to have each person in Planning rate each project on a 1 to 5 scale with respect to value to the University, value to the project client(s), and professional value to the people in Planning. Weights of .6, .3, and .1 were assigned respectively to these values. Although arbitrary, these weights do provide a basis for valuing planning projects.

Given "values" of projects and estimating time requirements it was possible to produce a list of projects for Planning to complete during 1979-80. Manpower constraints then provide a cut-off point for feasible, high priority projects. This method helped to reach decisions to go ahead with a computer-based planning information system and to delay student attrition studies. The resulting list of projects also provides a basis for discussions with top administrators about priorities. While they shouldn't be expected to review all projects, the Provosts, Vice President, and President can look at five or ten projects around the cut-off point.

Conclusion

This author believes that strategic planning is extremely important. An individual or an organization will always be faced with more work than resources permit. It is therefore crucial to make strategic decisions about what should be done and what should not be done. The strategic planning framework, analysis, and processes outlined in this paper were integrated from existing techniques. The approaches presented and examples of planning at CMU were provided to be descriptive, rather than normative. More research should be done on the framework and the processes, especially concerning the measures that are used. It is also important to understand how a framework or process should vary given the goals and structure of an institution.

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Planning for Contingencies in the 1980's

Jane C. Frank

The critical problems facing colleges and universities in the coming decade are: (1) declining enrollments (up to 35 percent in New York State by 1990, greater for some institutions); (2) increased costs per student because of fewer students, changing clientele, rising energy prices, and rising personnel costs; and (3) declining and changing financial resources due to increased competition for a declining pool of funds (both public and private sources). Any one of these problems alone might be handled in standard ways, but the combination of all three may be deadly unless major organizational changes are undertaken. Campus environments are not generally conducive to this type of response. Internal, campus-level problems include a lack of full awareness of the magnitude of these problems by many within the institution, a corresponding lack of integrated planning and leadership, and consequently, general campus inertia. The result is likely to be that by 1990 most institutions in New York State will have either experienced a decline in enrollment or changed their programs or clientele to maintain enrollment levels. Each institution has to make choices now which will affect its position during the 1980's. The purpose of this paper is to suggest those responses and action which appear to be the most promising for institutional pursuit.

There are many possible actions and strategies available to colleges in response to these problems (Frank, 1979). Prior to determining specific actions, however, each institution must recognize these problems within its own campus context, be aware of the external situation and constraints, and develop an integrated, but ever-changing plan for responding. The realities which are likely to be most crucial for individual institutions are:

- For most institutions, survival and health will require a significant planned reduction in enrollment and faculty size.
- Institutional survival and health will depend greatly on market positioning.
- Development of alternative markets will not, in most cases, alleviate enrollment problems and may create particular service problems and increase costs for the institutions.
- Few institutions will avoid financial problems.
- Personnel issues are crucial to institutional survival. Faculty size and composition will affect costs, programs, educational quality, and general flexibility. Administrative size, structure, and effectiveness will be challenged and under stress.
- Phasing out of peripheral academic programs may be a useful activity for institutions, but such actions will involve considerable risks including serious personnel problems.
- Investments in alternative energy systems and facility uses may enhance the long term financial position of a campus.
- All of these issues may generate conflict internally and with the public. This conflict, coupled with the participatory management style prevalent in colleges, contributes to institutional inertia. Leadership in overcoming this inertia, in a rational way, will be a major contribution to survival during the coming decade.

Institutional strategies addressing these areas will be discussed under the two broad headings of marketing and integrated planning for contingencies.

Integrated Planning for Contingencies

Although colleges and universities have many options for responding to declining enrollments, the central ones are determining the projected size and cost of the institution and the corresponding strategies to achieve it. For most institutions, reduction in size will occur. Prior planning may make the reduction less traumatic. Choosing appropriate goals and supporting strategies is a primary step; being able to develop alternatives if it becomes apparent that the goal cannot be met will probably be an attribute of most surviving and healthy institutions. Putting energy just into preventing declining enrollment and not being able to cope with constant change, fluctuations, and financial problems is not a good strategy.

As planning for the decade occurs, all constituencies--faculty, administration, and support staff--must be part of the process. The traditional, participatory governance structure on most campuses provides an avenue for involvement. Personnel issues, curriculum decisions, and financial concerns affect all. The products of their involvement in the planning process reinforces its importance: (1) a commonalty of understanding about the mission and goals of the institution and strategies to implement them; (2) better allocation and utilization of resources; (3) energy directed to essential activities; (4) evaluation and based on objective terms; and (5) ultimately, survival of the institution (Parekh, 1977).

Institutions often fail to achieve these products because constituents do not accept the same assumptions about the future which, in the past, has resulted in inertia and internal organizational conflict. Particularly for planning for the 1980's, efforts must be made to educate the entire campus community about the realities of the decade. It is from both a common premise and a shared goal that institutional cooperation and planning will progress.

Beyond the participatory effort, there must still be strong mechanisms to overcome the conflict and inertia which will certainly remain. No one will want their program to be cut or their position eliminated. Strong leadership and the exercise of central authority with sensitivity to both human and institutional needs will be necessary. The needed changes are apt to be too great for general consensus to be sufficient though it will still be necessary to the degree that it can be attained.

There is no substitute for integrated planning regarding personnel policy. Reductions in students will mean a reduction in staff. For those few institutions who will not experience an enrollment decline, personnel costs will still be a problem. Salaries affected by inflation, older and more expensive faculty and staff, and later retirement will contribute to increased costs. These cost problems may be aggrevated by collective bargaining agreements, morale problems, institution's need for flexibility in curriculum planning, and new clientele with different needs.

Each institution should develop a realistic staffing plan which should be updated annually to reflect budget, enrollment, and program plans. Details of the plans will vary by institution but may include planned reduction, reallocation of vacated tenure slots, set ratios of tenured faculty by rank, maximum probationary period for tenure appointments, non-tenure appointments, early retirement options, guidelines with respect to the reduction of personnel because of financial exigency, and retraining programs (Furniss, 1973; Commission on Academic Tenure, 1973). These elements are applicable to faculty or staff; no segment of the college community should be isolated from the changes.

Part-time staff, while providing flexibility and reduced costs, may affect the institution's productivity (especially research and student counseling) and quality of programs and teaching. Any choice involves risks which must be weighed.

Although personnel costs are the largest single item in the budget, energy costs are rapidly increasing. Long-term financial planning must include provisions for dramatically rising energy costs. Investment in alternative energy systems and corresponding planning of facility use may enable some institutions to weather the decade.

Marketing

Marketing has been a popular slogan for the development of recruiting programs on many campuses for the past decade. Few institutions have comprehensive marketing programs based on knowledge of the institution, market positioning, current clientele, and potential markets. Without such knowledge, an institution may lose its competitive edge and jeopardize its health and survival.

At the base of any marketing program is the institution's identity and mission. This includes its educational philosophy, role and scope, and goals (Shirley and Volkwein, 1978). Chait (1979) suggests that "mission madness" should be translated into more actions to better aid the real goal of institutional survival. Actions follow direction and leadership, which must be defined by the mission and corresponding marketing program. A marketing program has two distinct aspects: market positioning and market development.

Knowledge of the institution in relation to its competition is the primary basis for market positioning. With whom does the institution compete? In which areas? How well does the institution compete? How do changes by the competitors affect the institution? How do changes at our institution affect the competition? These are some of the questions involved with determining and evaluating an institution's market position. This information provides a base for planning institutional strategies to respond effectively to competition.

Such knowledge and appropriate responses will enhance the institution's position and thus contribute to its success through the 1980's. One example is a study by Lay and Maguire (1978) who have studied Boston College's competition to monitor the effects of changes in policy at other institutions on the behavior of applicants which could affect Boston College's policies. This specific approach is only one way of monitoring an aspect of competitor behavior which influences an institution and its market positioning.

Marketing, however, is more commonly recognized as a cluster of techniques for market development: to identify the college's clientele, to determine their needs, to develop programs and services for responding to those needs, and to advertise the availability of those programs. This type of marketing approach will be the most effective way of strengthening institutional drawing power and maintaining enrollments. An inability to keep up with a changing student market may result in losses to competing institutions. Further, marketing analysis provides the tools for evaluating alternative market development, i.e., exploring student markets other than those already served by the institution.

Some examples of types of marketing analyses are:

- Gorman (1976) identified institutional qualities which could be promoted to attract more traditional freshmen.
- Grites and Teague (1978) investigated the reasons why students choose not to attend an institution to which they were admitted and suggested ways to increase those enrollments.
- The Atlantic Community College Response Analysis (1979) examined the needs of the local community and suggested more job skill training courses, more dissemination of information about the school, and the development of one-credit courses for adults.

In each of these cases, the attractiveness and drawing power of the institution for a specific type of student is being evaluated. A number of researchers have looked at the components of attractiveness which should be monitored. In general terms, they include the following (Rowse, 1978): atmosphere--friendliness, warmth, culture, intellectural orientation, special interest opportunity, and financial health; curricular or program distinctiveness; general reputation and awareness--institutional age and market area; academic quality--selectivity level, job placement level, and research orientation; and practicality--cost and convenience, preparation for future, and admissions standards.

Market development to attract students can have several directions. The first and easiest is to market the college to its "traditional" student type. Some institutional actions are: to accept more students from the applicant pool, to recruit more in order to increase the number of applicants, and to increase the yield, i.e., try to get more students who are accepted to attend the institution.

The second approach to market development is to attract new students, for example, adult learners, minority students, and foreign students. The adult student market has been the fastest growing segment in higher education. And, although this growth continues, O'Keefe (1977) has documented a slower rate of growth from +21 percent between 1969-72 to only 8 percent between 1972-75. He concludes that while adult education may grow during the 1980's it will grow at a slower rate.

Serving adults may also be expensive for an institution. For example, it takes several part-time students to equal one full-time student but this does not adequately reflect the costs of certain services to students such as counseling and record keeping. Responding to increased competition from other agencies or institutions and meeting different needs may also add to the cost of adult programs.

Institutions will, however, have more adult students and proportionately more minority students--especially black and hispanic--during the 1980 decade (Rowse, 1979). In general, higher education has two choices: (1) to keep current college participation rate for the minority groups and experience a greater-than-anticipated decline in enrollments, or (2) develop techniques for recruiting and retaining minority youth in college. The majority of minority students who graduate from high school enroll in college. But, many fail to complete high school. College recruitment and cooperative programs throughout the high school years may be effective, but costly. Once in college, only about 40 percent of the minority students ever graduate compared with their white counterparts' graduation rate of over 50 percent. If their figures were equalized through special programs, considerably more young people will graduate and college enrollments with the minority populations will increase.

Foreign students have increased in numbers and are a potential market (Julian and Slattery, 1978). But, although the numbers are increasing, a smaller proportion of foreign students are enrolling in higher education institutions in the Northeast. Those that do enroll are seeking degrees in engineering, business and management, mathematics, and computer science; they are competing for seats in already popular programs. Before developing this market, colleges must consider costs for recruiting, programs, and services such as counseling and language assistance.

Although new markets are touted as possible solutions to declining enrollments, the realities of cost, services, and competition appear to undermine that hope. Each institution must assess its own current situation and weigh the alternatives carefully.

The development of a market program "brings people, programs, planning, and process together in an objectives-center system" on a continual basis (Johnson, 1979). Involvement of the many campus constituencies in the continual development of a marketing plan to keep abreast of market positioning and recruitment efforts, will ensure a variety of perspectives and a campus understanding of the realities of the situation. This campus involvement in the direction of the institution through market development is one component of the fight against inertia.

Conclusion

Most higher education institutions will experience enrollment declines during the 1980's. The magnitude of the decline and the fact that it will occur in a period of less than ten years means that all institutions will feel the impact in some way or other. The internal conflicts generated by declining enrollments and financial strain may be ameliorated by comprehensive, campus-wide planning coupled with educational leadership.

The Carnegie Foundation's More Than Survival suggests, "a good place to start is with the recognition that growth fosters neither the habits of mind nor the organizational arrangements required for adjusting to declining growth"--or absolute decline. New "habits of mind" for the coming decade must include two elements: (1) knowledge of the institution, especially in relation to its competition; and (2) a campus mobilized to confront the enormous changes of the decade. Even these two elements will not guarantee institutional health and survival into the next century, but they will provide an institution with its best chance for a promising future.

The framework presented here--integrated planning for contingencies and marketing--holds promise for institutions of higher education planning for a decade of multiple problems and changes. A recognition of the realities of the 1980's by all campus constituencies is the first step in the process of responding effectively.

Integrated planning and marketing provide a framework for developing actions and strategies. This is, however, no substitute for educational leadership by both the faculty and administration, and hard work and commitment by all.

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On the Use and Misuse of Systems Approaches

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American Heritage Dictionary defines a system as :

A group of interacting interrelated or interdependent elements forming or regarded as forming a collection or an entity.

A set of interrelated ideas, principles, laws, rules, procedures or the like.

A set of objects or phenomena grouped together for classification or analysis.

Systema (Greek) a composite whole.

How could such a notion be of interest to institutional researchers? "Systems approach", "data base", "management information systems", are buzz words of the Zeitgeist. Institutional Research functioned before they were invented, and will function more effectively when they are properly set into the perspective of an educational setting.

The post sputnik space race spawned these now fashionable terms so readily taken into the vocabularies of educators.

Conceptually we are bound by symbols to invent syntax, rules relating symbols to symbols, and to the ordering of language. Conceptually we cannot escape the system of languages except with great difficulty. Nor can we escape the imposition of our symbols upon an unspeakable, existential, outside of self reality. Yet we frequently confuse the symbol with the reality as Korzybski suggested, and respond to the symbol as if it were reality. Beyond that, we often behave as if we agreed upon the meaning our symbols have, universally, when in fact only the notation of mathematical operators and numerals approach some small degree of commonalty.

Why did "institutional research" come into being in the first place?

To answer some questions:

Who?
Does what?
To whom?
At what cost?
For what end?
In what setting?
With what effects?

In educational settings, there are sounds uttered about purposes, objectives, management, governance, organization, and leadership. Exactly what might be the meaning of these utterances, confuses the mind. There was a time we heard quite often that education should operate by "management by objective". That combination of sounds set off massive efforts almost everywhere, and became a "buzz phrase".

As a first approximation of agreement about symbols, let us assume the following:

<ins>Purposes</ins> express judgments about desirable things which are needed, useful, good, just.

<ins>Objectives</ins> determine particular work to be performed, processes used, and resources to be tapped by the adoption of a program of action.

<ins>Management</ins> is said to be getting a job done, it is the delivering of goods or services. The development of work programs, provision and use of resources of people, plant, equipment, and support services are all involved.

<ins>Governance</ins> is said to be the procedural process for relating power to purpose and for the responsible exercise of power. Sometimes it is an expression of the general will determining broad policy about objectives, programs, standards, resources, and benefits.

Organization is said to be a structure for the interaction of leadership, governance, and management, basically translating purpose into performance, i.e., the structure of power and work activity.

Leadership persuades those in governance to decide, and encourages those in management to perform. Academic leadership seeks desirable, definite, timely, and positive decisions about those who are served as well as those who do the serving.

Educational institutions may indeed be organized as if they were systems, but education as the transmission of a culture, may not be a system, nor does education occur only within educational institutions. Indeed, it had been clearly established by the end of the seventeenth century that the teaching elements of educational institutions were successful only to the degree that the teaching approach accommodated itself to the individual. We may be a little slow in recognizing that wisdom.

Similarly, we may be a little slow in recognizing that when a master course schedule is prepared, with sixty percent of the schedule put into place by exception to the standard time module, that our system is one of exceptions. That is an exceptional system.

Systems approaches have value when we know an objective. They are also of value when they are used with technology, laws, products, and classification schemes.

Educationally it is possible that ninety percent of the time we do not know what the objective is, rather we have vague notions about purposes. Exactly how a task relates to the purpose or objective of the institution is equally unknown to the institutional manager. This may not be unlike the condition of jet pilots, flying on instruments, not knowing from where they left, not knowing where they are going, but flying at record altitudes and achieving record speeds. Technology has a place, but the superiority of man over machine consists of our ability to ask questions.

When formed according to certain rules questions can be answered far faster by machine than by people. Yet a nagging doubt remains that these may not be among the best questions. It is possible that the answers we get come to us about questions not worth asking.

Institutional research offices exist to help institutions do the things that the institution has to perform anyway. The needs to plan ahead, to seek facts, and to think straight, intensify as economic and enrollment declines touch our institutions. The most elusive of these, thinking, requires a recognition that rigid approaches to new situations may give a sterile result. To build bigger systems of computer applications, to take large amounts of University resources in designing a so called data based management system, to continue to rush headlong in pursuit of bigger, faster, and more complicated reports seems fashionable. Are we producing better products as a result of our efforts? Certainly the products are different in our offices now than they were just fifteen years ago. Operationally, we continue to behave as if we believed that all we need to do to improve our functioning consists of designing and implementing larger computer systems.

Three administrative realms appear quite independent of the neat, tidy, and secure world known as computing systems. These are, the delineation of responsibility, the delegation of authority, and the provision of timely decisions. All of these are functions of individual personality as these combine into an administrative style. All of them directly impact the functioning of a University, and all of them defy systematic analysis in their execution. It seems a clear misuse of our computing skills to provide information which is not used. Clearly, decisions are made by people, and information does not make decisions.

The specification of objectives and functions is predicated upon knowledge _a priori_ of interaction effects among those who design, those who implement, those who carry out, and those who are to receive treatment. These are never known _a priori, but can be discovered_ by research.

Lest we take up a new direction as an article of faith in spawning research, heed the admonition contained in the Hiawatha parody by Sir Maurice Kendall. ("Hiawatha Designs An Experiment" - originally published in the American Statistician, Dec 1959, Vol 13, No 5. Reprinted by permission).

Hiawatha, mighty hunter
He could shoot ten arrows upwards
Shoot them with such strength and swiftness
That the last had left the bowstring
Ere the first to earth descended.
This was commonly regarded
As a feat of skill and cunning.

One or two sarcastic spirits
Pointed out to him, however
That it might be much more useful
If he sometimes hit the target.
Why not shoot a little straighter
And employ a smaller sample?

Hiawatha, who at college
Majored in applied statistics
Consequently felt entitled
To instruct his fellow men on
Any subject whatsoever,
Waxed exceedingly indignant
Talked about the law of error,
Talked about truncated normals,
Talked of loss of information,
Talked about his lack of bias
Pointed out that in the long run
Independent observations
Even though they missed the target
Had an average point of impact
Very near the spot he aimed at
(With the possible exception
Of a set of measure zero.)

This, they said, was rather doubtful.
Anyway, it didn't matter
What resulted in the long run;
Either he must hit the target
Much more often than at present
Or himself would have to pay for
All the arrows that he wasted.

Hiawatha, in a temper
Quoted parts of R. A. Fisher
Quoted Yates and quoted Finney
Quoted yards of Oscar Kempthorne
Quoted reams of Cox and Cochran
Quoted Anderson and Bancroft
Practically in extenso
Trying to impress upon them
That was actually mattered
Was to estimate the error.

One or two of them admitted
Such a thing might have its uses
Still, they said, he might do better
If he shot a little straighter.

Hiawatha, to convince them
Organized a shooting contest
Laid out in the proper manner
Of designs experimental
Recommended in the textbooks
(Mainly used for tasting tea, but
Sometimes used in other cases)
Randomized his shooting order
In factorial arrangements
Used in the theory of Galois
Fields of ideal polynomials
Got a nicely balanced layout
And successfully confounded
Second-order interactions.

All the other tribal marksmen
Ignorant, benighted creatures,
Of experimental set-ups
Spent their time of preparation
Putting in a lot of practice
Merely shooting at a target.

Thus it happened in the contest
That their scores were most impressive
With one solitary exception
This (I hate to have to say it)
Was the score of Hiawatha,
Who, as usual, shot his arrows
Shot them with great strength and
    swiftness
Managing to be unbiased
Not, however, with his salvo
Managing to hit the target.

There, they said to Hiawatha,
That is what we all expected.

Hiawatha, nothing daunted,
Called for pen and called for paper
Did analyses of variance
Finally produced the figures
Showing beyond peradventure
Everybody else was biased
And the variance components
Did not differ from each other
Or from Hiawatha's.

This last point, one should acknowledge
Might have been much more convincing
If he hadn't been compelled to
Estimate his own component
From experimental plots in
Which the values all were missing,
Still, they didn't understand it
So they couldn't raise objections
This is what so often happens
With analyses of variance).

All the same, his fellow tribesmen
Ignorant, benighted heathens,
Took away his bow and arrows,
Said that though my Hiawatha
Was a brilliant statistician
He was useless as a bowman,
As for variance components
Several of the more outspoken
Made primeval observations
Hurtful to the finer feelings
Even of a statistician.

In a corner of the forest
Dwells alone my Hiawatha
Permanently cogitating
On the normal law of error
Wondering in idle moments
Whether an increased precision
Might perhaps be rather better
Even at the risk of bias
If thereby one, now and then, could
Register upon the target.

Clearly, there are approaches to the issues of university administration in which computing systems are appropriate. There are others which are inappropriate. Wisdom for institutional researchers consists of knowing the difference, and our first task is establishing the criteria of differences, realizing that a difference to be a difference must make a difference.

Experience With Planning Support Systems

R. Wade Schuette

Cornell University

I. Introduction

The Department of Institutional Planning and Analysis (IPA) at Cornell has a responsibility for obtaining and structuring information for budgetary planning, and for reporting to the governing Board of Trustees. Given the fairly large scale of operations, Cornell frequently needs to take campus surveys of the attitudes or opinions of specific groups to stay in touch with what's going on on campus. IPA is involved with making those surveys possible, rapid, valid, and reasonably inexpensive. In addition to providing information, the office also assists in the creation and operation of such planning tools as mathematical models for the analysis of budgetary policies, upcoming legislation, etc.

The needs for surveys, budgetary planning and analysis, and presentation of data to the Board are handled, in part, by techniques with the acronyms CAMPOLL, EFPM, and The Indicators. The concepts are straight-forward and transportable to other institutions, but not as widely used as those facts would lead one to expect.

II. CAMPOLL - A Campus Polling Technique and Organization

Exhibit 1 shows part of an information package that is mailed out by IPA to department heads and other Cornell staff interested in campus polling. The unique points are that an organization has been permanently established to carry out campus surveys--a fact that allows it to develop the experience needed to do the job effectively--and that the organization maintains on-call

Exhibit 1

CAMPOLL INFORMATION SHEET

A. What is CAMPOLL?

CAMPOLL is an on-campus opinion polling organization which conducts telephone surveys for various departments. The surveys are used to gather student and staff opinions on numerous topics, services, programs, and problems. The information often assists the sponsoring department in making better decisions, improving programs and services, or just identifying problems requiring attention. CAMPOLL is an intermediary between these departments and the public. Services include translating concerns into surveys, generating samples, collecting data, analyzing and interpreting results. Additionally, reports may be written upon request.

B. Which departments make use of CAMPOLL?

It varies from year-to-year; virtually any department may sponsor a poll. These are the departments and groups using CAMPOLL last year:

1. Alcohol and Drug Education Committee
2. Career Center, College of Agriculture and Life Sciences
3. Senior Class of 1979
4. Division of Campus Life
5. Office of Resident Instruction, College of Agriculture and Life Sciences
6. College of Arts and Sciences
7. University Health Services
8. Little Eleven Group through the Campus Council
9. Personnel Services
10. Dean of Students Office
11. Transportation Services

C. How does CAMPOLL typically operate?

We meet initially to assess the feasibility of using CAMPOLL to address your concerns. If we decide the service is appropriate, you formally articulate your concerns in a draft of questions. We modify the questionnaire to be appropriate in terms of substance and format. You specify the appropriate population to be polled and we select the sample, collect the data through pollsters, code and keypunch surveys, and finally statistically analyze the results. You are then presented with a computer generated or written report of the results. We will assist in further interpretation of the analysis of data if needed.

D. How qualified is the CAMPOLL Staff in conducting Survey Research?

Dr. Slovacek and Mr. Levin have completed graduate work in Education Research Methodology, Educational Statistics, Survey Research, Psychometrics and other relevant fields. Several staff members have extensive computer programming skills. This is the third year IPA has sponsored CAMPOLL; over a dozen polls are completed by IPA each year.

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a crew of roughly 50 students who carry out the job of a telephone poll of the desired population sample.

The organization has its own coordinator, and is directed out of the IPA office by Dr. Simeon Slovacek. The IPA office is in the best location for knowing what data-bases are available for selection of the desired cross-section of students, faculty, or employees for the survey in question. In addition, an advantage of running the operation as an enterprise (charges range from $100 to $1000 for surveys) is that the staff is also always there and ready to go in case an emergency survey is needed by the top administration.

II. EFPM -- Financial and Student Flow Modeling.

A number of attempts have been made to set up computer models for both the general purpose (unrestricted) budget and such things as student flow and faculty retirement. While the early attempts generated a fair amount of interest, they were expensive and had little impact. In the past year, however, some notable successes have finally emerged from the process. The reasons seem to be a combination of prior experience in knowing what to avoid, and the arrival on the market of EDUCOM's software package called the EDUCOM Financial Planning Model (EFPM for short.) The author has had the primary responsibility for introducing this model on campus.

Information on EFPM can be obtained from the Interuniversity Communications Council, Inc. (EDUCOM), located in Princeton, New Jersey. In an exceedingly brief synopsis, the package is really an interactive modeling language that can be learned quickly. It allows for the definition of a number of line items, various growth functions and constraints, complex budget relationships between items, etc. Once set up, the model allows the user to run projections for multiple years, do sensitivity analysis, and, most importantly, it allows for a very rapid (often on-line) change of values and relationships between items. The simplest output is basically a financial spread sheet. A trivial model was set up, and the Income & Expense statement generated is shown in exhibit 2. The numbers in the examples show bear no relationship to reality at Cornell, by the way.

With constraints imposed that the number of students be between 8000 and 20000, the number of faculty be between 600 and 2000, the student/faculty ratio be between 5 and 20, and that the bottom line be positive (a surplus), the model can be queried to find out what changes are needed to meet those constraints. Exhibit 3 shows the results of such a query: it says, for example, that the present number of students (16,500) is too low, and that it would have to be raised to the range 18,200-19,999 for all constraints to be satisfied, if all other variables remained unchanged.

The model also offers graphical output. Exhibit 4, taken from a different model, shows how the line item called "total" varies with a change in the "salary % annual growth." Exhibit 5 shows how EFPM can mark out with "F" the set of feasible combinations of a real growth in faculty salaries (after inflation) and a given fraction of faculty retention from year to year (assuming no new hires, just a loss by attrition.)

The examples shown serve a purpose besides explaining to the reader what EFPM can do -- they are also about the limit of complexity that it is possible to explain to a potential user in one sitting. It is vital that an administrator not be overwhelmed by his or her first exposure to a computer-based model. The model shown is far simpler than the final working budget model must be, but the point is that both the model and the user must evolve together towards that complexity. With EFPM, a very simple model can be used as a starter, with the user's interest held by

EDUCOM Financial Planning Model

```
TRIAL FORECAST:
_____________________________________________________________________________

FORECAST FOR ADMINCO UNIVERSITY
                                                               REPORT NO.  3

                                    1979        1980        1981        1982
                                    ----        ----        ----        ----
_____________________________________________________________________________

TUITION INCOME                    33,000      34,026      37,782      40,059
OTHER INCOME                      20,000      20,400      20,808      21,224
                                --------    --------    --------    --------
TOTAL INCOME                      53,000      54,426      58,590      61,283

FACULTY COUNT                      1,694       1,664       1,664       1,664
AVERAGE FACULTY SALARY                25.000      26.500      28.090      29
FACULTY COSTS                     42,350      44,096      46,742      49,546
OTHER EXPENSE                     10,615      10,625      11,887      12,488
                                --------    --------    --------    --------
TOTAL EXPENSE                     52,965      54,721      58,629      62,034
_____________________________________________________________________________
                                --------    --------    --------    --------


SURPLUS(DEFICIT)                      35        -295         -39        -751
```

Exhibit 2 -- Demonstration 3 year projection

```
END PERIOD:         1983
                                      FEASIBILITY RANGE    CONSTRAINTS
ID, NAME,      VALUE, STATUS,  MIN,           MAX,        MIN,     MAX:
_________________________________________________________________________

 10 INFLATE1      0.080 LO       0.325          ++       (NONE)   (NONE)
 11 INCGROW       -.060 LO       -.006          ++       (NONE)   (NONE)
 12 EXPGROW       0.040 HI      -2.093        -.178      (NONE)   (NONE)
 20 STUDENTS   16,500   LO    18,200       19,999         8,000   20,000
 30 TUITION       2.000 LO       2.123          ++       (NONE)   (NONE)
 14 TUITGRO       -.010 LO       0.024        0.024      (NONE)   (NONE)
 40 FACULTY     1,694   HI       825        1,611           600    2,000
331 FAC.RETN      1.000 HI       0.831        0.975      (NONE)   (NONE)
 50 SALARY       25.000 HI       --          23.779      (NONE)   (NONE)
332 F.SALGRO      -.020 HI      -2.127        -.046      (NONE)   (NONE)
_________________________________________________________________________
-- = NO MINIMUM FOUND.
```

Exhibit 3 -- Searching for acceptable ranges

EDUCOM Financial Planning Model

```
                              IMPACT GRAPH
   TOTAL                          VS.   SALARY % ANNUAL GROWTH
     IN PERIOD    5 (1982)

 TOTAL

15,505  +
        +                                                  +
15,146  +                                             +
        +                                        +
14,788  +                                   +
        +                              +
14,430  +                         +
        +                    +
14,072  +               +
        +          +
13,713  +     +
        +-----+----+----+----+----+----+----+----+----+----+-
            6.00%     7.00%     8.00%     9.00%     10.00%  1
SALARY.P         6.50%     7.50%     8.50%     9.50%     10.50%
```

Exhibit 4 -- Sensitivity Analysis

```
                        1979  THRU  1983
                            TRADEOFF

           FAC.SALRY REAL GROWTH      VS.   FACULTY FRACTION

F.SALGRO                         (F = FEASIBLE POINT)

   -.000 +    F
         +
   -.010 +    F    F
         +
   -.020 +    F    F    F
         +
   -.030 +    F    F    F    F
         +
   -.040 +    F    F    F    F    F
         +
   -.050 +    F    F    F    F    F    F
         +
         +----+----+----+----+----+----+
            0.950     0.970     0.990
FAC.RETN         0.960     0.980     1.000
```

Exhibit 5 -- Search for solutions

the fun of changing values on-line on a CRT and watching the impact show up immediately on the "bottom line". The satisfaction an administrator achieves in mastering such a simple model and finding a set of changes that will balance the budget is a step that is often ignored in the rush to set up far more complex models which no one ever feels comfortable with and which are ultimately ignored due precisely to that small edge of anxiety.

Progressing by simple expansions of single lines into multiple lines, and then repeating the process, that simple model has now expanded here to one with over 300 variables and 15 sub-reports that explain lines in the overall report. The "magic" element in gaining acceptance of the model was the use of the maleability of EFPM to expand the complexity of the model only as fast as the user requested and found comfortable.

A side benefit of using any model is that the user is forced to come to grips with exact definitions of terms that have often been left vague in the past. I.e., the process of deciding what information is relevant for budget planning is assisted greatly by simply accepting the information needs of the model as a place to start.

Ms. Sally Sanderson, in the IPA office, has used EFPM to model the "student flow" from semester to semester at Cornell. In that case, the numbers in the printout represent students, not dollars, but in all other respects the process of setting up the model is the same.

III. The Cornell Quarterly Indicators

After varying experience with ad hoc, annual, and monthly reporting efforts, IPA has settled on use of quarterly reports for reporting the state of the campus to top administration and the Board of Trustees. Financial and other institutional data, both historical and current, are presented and compared in attempts to locate and highlight variances and trends.

Cornell Indicators

SECOND QUARTER 1978-1979 REPORT

JANUARY 1979

		Pages
EMPLOYEES	-- The number of regular full-time non-student employees holds steady in the second quarter of this year.	2, 18
STUDENTS	-- Applicant quality remains the same as last year, but the number of applications returned improves.	3
	-- Applications, acceptances, and matriculations of the latest freshman class are analyzed by U.S. region.	4, 19
	-- Enrollments are shifting from graduate to first professional and undergraduate at Cornell.	6, 20
	-- A survey of undergraduate registrations, withdrawals, and transfers shows some emerging trends.	8
	-- Undergraduates are graduating later, although upper-class transfers delay graduation less than freshmen.	10, 21
	-- Cornell draws a wide range of foreign students.	11
UTILITIES	-- Conservation efforts and fuel-management practices at the Steam Plant have a positive impact on costs.	12
	-- Telephone use grows slightly, but shifts to Direct Distance Dialing.	13
ECONOMY	-- Economic price indices continue to rise. The latest figures are given for CPI, DPI, HEPI, and Tuition.	14
FEATURE:	COMPARISON WITH PEER INSTITUTIONS -- This is the initial chapter in a series of articles comparing Cornell with other schools across the country. This issue considers:	16
	-- Research overhead recovery rates and Federal spending	17
	-- Comparative tuition, room & board, and financial aid	17

Exhibit 6

These reports have been structured around the NACUBO report entitled Financial Responsiblities of Governing Boards of Colleges and Universities, a 1979 publication that has provided a number of valuable ideas and formats. The reports have been segregated into two portions: the financial balance sheet data, which are handled by the Controller's office, and the other institutional data, which are handled by IPA in the report "The Cornell Quarterly Indicators". An example of the format and contents of one issue is shown in exhibit 6.

The articles themselves are prepared in a short, news-weekly style, with as much graphical display of data as possible in the main portion of the Indicators, and with supporting tables in the appendices. The Indicators are distributed to deans and directors, as well as trustees. Over time, a consistent historical series of tables have been presented, in formats that are familiar to the decision makers.

The editor of each issue (it varies) and the Director of IPA (who is John Rudan) meet with the senior administration to discuss each issue before it is published. In the indicators, as well as in EFPM, the use of graphical methods of conveying information has been an important part of the successful acceptance of that technique of providing information.

IV. Conclusions

The three techniques presented for dealing with the tasks of the institutional research office have proven successful at Cornell. The key to success in each case seems to be the use of as much work is needed at the i.r. level to make the planning data trivially clear to users at the decision-making level. That small increment in clarity and comfortableness with the data seems to pay off in terms of acceptance of the results into the decision making process.

Faculty Resource Reallocation: A Practical Methodology

Frank B. Campanella

Boston College

Introduction

Perhaps in these times the very use of student-faculty ratios need not be argued. Outside of the University a number of our publics, from Financing Authorities to accrediting bodies, to parents of students, exhibit a continuing interest in these relationships. These groups often use them as a proxy for educational quality, perhaps even incorrectly at times. There are those, too, who are interested in productivity; faculty who would like to participate in productivity gains; those who would argue for various reasons that productivity increases are not possible in academe; and various federal and state agencies, higher education organizations and lobbies, interested in "accountability".

Within the institution it would seem apparent that at the University level, effective long range planning requires knowledge of the number of faculty required to serve a student body of a given size. This is especially true in an enrollment-dependent institution or in one developing alternative plans in preparation for the risk of declining enrollments. At the School and departmental level these ratios are useful mostly as guidelines in making resource allocation decisions.

The purpose of this paper is to suggest a methodology for the use of student-faculty ratios in making decisions about the allocation and reallocation of faculty resources. At the outset it should be clear that neither the computation nor the application of such ratios is viewed as an exact science. On the other hand the establishment of student-faculty ratios is not a completely arbitrary exercise either. Deans, chairmen, and faculty do have ideas about appropriate section sizes and faculty work-loads, given the nature of the subject matter to be taught, effective teaching methods, course levels, and departmental involvement in other scholarly and community activities. These factors vary widely among departments and within individual departments. Actual student-faculty ratios should be allowed to vary similarly; and ideally any system devised to allocate faculty resources should recognize and be responsive to these differences. The purpose of this paper is to describe such a system and to demonstrate its use.

Methodology

The proposed student-faculty ratio is defined as: Student Credit Hours per Full Time Equivalent Faculty, (SCH/FTEF). Given the great variations in credit hour requirements for full-time students across graduate programs, and the problem of defining graduate and undergraduate FTE's of part-time students, it was finally decided to use "Student Credit Hours" itself as the numerator in the student-faculty ratio, rather than convert credit hour data to FTE students.

The use of SCH data also offers the advantage that most of those concerned with these sorts of measurements understand and agree on the definition of Student Credit Hour. It provides a common measure across departments and course levels, and finally it is consistent with the methodology employed by the National Center for Higher Education Management Systems (NCHEMS) in its cost model RRPM.[1]

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[1] RRPM was used extensively by Boston College as the work-horse for an academic planning effort carried out in 1974-75. It permitted a bottoms-up testing of the aggregate student-faculty ratio assumptions made by a predecessor Fiscal Planning group.

In the proposed process, academic departments are asked to submit recommended teaching methodologies, specifying average section sizes by course level, where course levels are defined as CORE, ELECTIVE, and GRADUATE. ("Lower Division", "Upper Division", etc. definitions might also be used.) The average section sizes so submitted by the various departments should generally be accepted by the College or University as submitted. If these appear to be unreasonable, they should be negotiated to an agreed on level with the department. This is critical if the proposed reallocation method is to be effective and acceptable to the department, when it becomes time to make the difficult decisions.

The other critical element, faculty Work-Load, is set at the College or University level. It should recognize the particular problems of various departments; e.g. the Sciences with very large CORE section sizes and the need to supervise low credit hour labs, Nursing with heavy contact hour commitments, Law with large section sizes and other departments, like History, etc., with large CORE section sizes and/or other unique teaching methods. All of which argue for exceptions to a standard semester hour load (e.g. 9 hours).

Given these data, Average Section Size and Faculty Work Load, it is possible to compute an EXPECTED SCH/FTEF Ratio, by course level for each department.

R_{ij} = $S_{ij} \times W_{ij}$ where:
R_{ij} = Student Credit Hour per FTE Faculty Ratio for the i^{th} department and j^{th} course level
S_{ij} = Average Section Size for the i^{th} department and j^{th} course level
W_{ij} = Work Load in hours for the i^{th} department and j^{th} course level

The number of departmental faculty EXPECTED in any time period t (actual or planned) becomes: $F_{it} = \sum_j \frac{X_{ijt}}{R_{ij}}$ where:

F_{it} = Total FTE faculty, EXPECTED for department i, at time t

X_{ijt} = Credit hours taught by the i^{th} department for the j^{th} course level at time t.

F_{it} can be compared with the actual numbers of departmental faculty, the VARIANCE determined and resource reallocation decisions made as required.

$V_{it} = F_{it} - J_{it}$ where:

V_{it} = Variance for the i^{th} department in period t

J_{it} = Actual FTE faculty for the i^{th} department in period t

There are just four reasons why a VARIANCE might occur:

1. Change in Average Section Size for any course levels. (S_{ij})
2. Change in Average Faculty Work Load for any course levels. (W_{ij})
3. Change in Mix of SCH across course levels.
4. Change in the absolute number of SCH taught. (X_{ij})

The proposed methodology will automatically account for conditions 3 and 4 above. The judgment of Deans and department chairmen can be used to permit VARIANCES caused by 1 and 2, or to decide to reallocate faculty resources to reduce the VARIANCE and to bring the number of faculty to the number required to accommodate the (actual or planned) volume of activity. This can be accomplished with full consideration of teaching methodologies specified by the department, while simultaneously reviewing the conditions which affect the specification of appropriate departmental faculty work loads.

Application

This methodology has been used at Boston College from a base-period planning effort in 1974-75 to the end of a four year planning horizon in 1978-79.

Computation of the SCH/FTEF by Department

1. Assume a department which plans to teach the following credit hours.

CORE	10000
ELECTIVE	6000
GRADUATE	800
TOTAL	16800

2. Assume further that the department specifies that it would like to teach these credit hours in average section sizes as follows.

CORE - Average Section Size 36
ELECTIVE - Average Section Size 25
GRAD - Average Section Size 10

3. Computation of an SCH/FTEF Ratio for its ELECTIVE courses would be as follows ASSUMING an average 18 hour (6 sections per year) teaching load for the faculty.

3a. 6000 SCH ÷ 3 SCH/student = 2000 students

2000 students ÷ 25 students/section = 80 sections

80 sections ÷ 6 sections/FTEF = 13.33 FTEF

3b. Thus the SCH/FTEF is 6000 SCH ÷ 13.33 FTEF = 450 SCH/FTEF

3c. More simply in terms of the earlier notation:

$$R_{ij} = S_{ij} \times W_{ij}$$

$$R_{ij} = 25 \times 18$$

$$R_{ij} = 450$$

Similar computations for CORE and GRAD courses would yield the following data.

	SCH	FTEF	SCH/FTEF
CORE	10000	15.43	648
ELECTIVE	6000	13.33	450
GRAD	800	4.44	180
TOTAL	16800	33.20	506.0

In summary, the department would require 33.2 FTE faculty in order to teach 16800 student credit hours, distributed over CORE, ELECTIVE and GRAD courses in the manner shown.

If we were now to take the ACTUAL student credit hours taught by a department in any future time period and divide by the SCH/FTEF ratios as noted or planned (recalling that these are generally based on section sizes specified by the department and standard work-loads), we can determine the number of FTE faculty a department would be EXPECTED to have in this time period. These can be compared to ACTUAL FTEF for the department. If a significant variance results for a given department, given this methodology, there can now be only three reasons;

1. Average Section Size as specified is too high or too low.
2. The Standard Faculty Work Load (after specified adjustments) is not appropriate for this department.
3. There are too many or too few faculty assigned for the ACTUAL credit hours taught by the departments.

The application of this methodology leads to the development of a set of five management reports.

Management Reports - Plan vs Actual

Following the example previously introduced, suppose four years later the department had 34.00 FTEF faculty and was teaching 16700 student credit hours distributed as follows:

CORE	11000
ELECTIVE	5000
GRAD	700
TOTAL	16700

Report I
PLANNED TEACHING METHODS

Course Level	Average Section Size	Faculty Work Load	SCH per FTEF
CORE	36	18	648
ELECTIVE	25	18	450
GRAD	10	18	180
TOTAL			506.0

It is important for all concerned, Deans as well as Chairmen, to have ready access to the basic data. This is particularly true if reallocation decisions are imminent.

Report II
SCH: PLAN vs ACTUAL

Course Level	SCH PLAN	SCH ACTUAL	VARIANCE SCH	VARIANCE %
CORE	10000	11000	1000	10.0
ELECTIVE	6000	5000	(1000)	(16.7)
GRAD	800	700	(100)	(12.5)
TOTAL	16800	16700	(100)	(0.6)

Report II is a standard "Variance" report.

Report III
FTEF: PLAN vs ACTUAL

Course Level	SCH ACTUAL	SCH/FTEF PLAN	FTEF EXPECTED	FTEF ACTUAL	VARIANCE FTEF
CORE	11000	648	16.98	16.00	(.98)
ELECTIVE	5000	450	11.11	14.20	3.09
GRAD	700	180	3.89	3.80	(.09)
TOTAL	16700	——	31.98	34.00	2.02

Report III is the key departmental report. Here ACTUAL credit hours taught are divided by PLANNED SCH/FTEF (in Col. 2) to yield EXPECTED numbers of FTE faculty (in Col. 3). ACTUAL FTEF are shown in Col. 4 and the difference between ACTUAL and EXPECTED FTEF are displayed in the VARIANCE columns. In this example it appears that there are three too many faculty serving ELECTIVE courses. One of these might well be shifted within the department to teach CORE level courses, while two others might be reallocated to other departments. Once again such actions would be taken after acknowledgement of the usual caveats; viz, assuming that the teaching methods remain valid, and that other conditions within the departments continue to justify adherence to the standard faculty work load.

Here too, it should be noted that there are now three values of the SCH/FTEF Ratio in operation for this department. These are identified as PLANNED, EXPECTED, and ACTUAL.

PLANNED	- as shown in Table I and in Report I	506.0 SCH/FTEF
EXPECTED	- ACTUAL SCH ÷ EXPECTED FTEF 16700 SCH ÷ 31.98 FTEF	522.2 SCH/FTEF
ACTUAL	- ACTUAL SCH ÷ ACTUAL FTEF 16700 SCH ÷ 34.00 FTEF	491.2 SCH/FTEF

The difference between PLANNED and EXPECTED here, is caused solely by the change in mix of the credit hours taught across the three course levels. Note the PLAN vs ACTUAL shift of 1000 SCH from the ELECTIVE level to the CORE level. Since the CORE level SCH/FTEF Ratio is considerably higher than that for the ELECTIVE level, the departmental Ratio (which is a weighted average of both) moved from the PLANNED level of 506 to the higher EXPECTED level of 522.2. It will require the reallocation of 2.02 FTE faculty to bring the ACTUAL level of SCH/FTEF from 491.2 to the EXPECTED level of 522.2

A final departmental report which can be of considerable help to the decision makers in making reallocation decisions, is an analysis, over time, of the composition of the total number of FTE faculty who are on standard contracts (tenured and non-tenured), the number which are FTE Part-Time, the number which are FTE Teaching Assistants and the FTE "Adjustment" for sabbaticals, leaves, etc. These data taken together, in addition to showing trends may also indicate where action can be taken or where the scope of feasible actions are limited e.g., by tenure or by large numbers of part-time faculty etc.

A university-wide summary report detailing the key elements of each department's plan and current activity is most helpful to Deans of multi-department schools and to Vice Presidents.

Report V
Student Credit Hour and FTE Faculty Data

EXPECTED vs ACTUAL
1978-79

	SCH			SCH/FTEF		FTEF		
DEPARTMENT	PLANNED	ACTUAL	VAR	EXPCTD	ACTUAL	EXPCTD	ACTUAL	VAR
Biology	11378	10526	(852)	641	607	16.43	17.33	.90
Chem	9275	9028	(247)	567	488	15.93	18.50	2.57
Geology	5427	4458	(969)	675	449	6.61	9.92	3.31
Physics	5002	5636	634	461	451	12.24	12.50	.26
Math	14131	14824	693	541	499	27.40	29.68	2.28
SCIENCES	45213	44472	(741)	566	506	78.61	87.93	9.32
Classics	---	---	---	---	---	---	---	---
English	---	---	---	---	---	---	---	---
Fine Arts	---	---	---	---	---	---	---	---
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HUMANITIES	---	---	---	---	---	---	---	---
--------	---	---	---	---	---	---	---	---
--------	---	---	---	---	---	---	---	---
SOC SCI'S	---	---	---	---	---	---	---	---
COLLEGE TOTALS	---	---	---	---	---	---	---	---
Law School	---	---	---	---	---	---	---	---
Business Schl	---	---	---	---	---	---	---	---
-------------	---	---	---	---	---	---	---	---
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-------------	---	---	---	---	---	---	---	---
UNIV TOTAL	---	---	---	---	---	---	---	---

Summary

While the basic methodology suggested here is not original, (it closely resembles that of RRPM) the application is quite different.

1. It is easily understood.
2. It is readily applied. Use of the computer is helpful, but not at all critical.
3. It is not cost-oriented and therefore avoids the multitude of problems associated with cost models. However it does address the most significant single component of academic department costs. A component not only significant in its own right, but also the component which is primarily responsible for driving other departmental cost elements.

4. It is sensitive to varying teaching methods required by differences in subject matter and course level.
5. It depends on departmental cooperation in specifying conditions which may later be used to allocate resources to or away from the department.
6. By avoiding the cost problems, it avoids the joint-product criticisms. At the same time it allows for reduced faculty loads (without focusing on the associated cost increases) in order to accommodate graduate education, or research activities or scholarly work in areas where the institution aspires to excellence.

The Departmental Profile--A Better Value-added Index

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In reporting a study of the differential impact of departments within colleges, Rodney Hartnett (1976) noted that "more likely than not, an academic value-added index for a college as a whole...will obscure more than it reveals." Although the original reason for producing Departmental Profiles was not to reveal these "hidden" differences, the truth of Hartnett's conjecture became apparent as the answers to questions such as "How do students choosing various major programs differ?" and "How are they alike?" were sought.

In an attempt to assist the various departments to develop a better understanding of their students, Departmental Profiles were developed based on responses to both freshman and senior surveys, as well as academic ability measures. These profiles displayed only the questionnaire items on which departmental majors differed significantly* from the total group of freshmen and/or seniors. Definite programmatic patterns emerged. The present study is an outgrowth of that effort, with the purpose of discovering which patterns or variables represent stable or replicable descriptors of particular programs.

Disciplines that represented the broadest range of program diversity and had a sufficiently large number of surveys available were chosen. The Profiles described here are those generated by students majoring in Biology, Business, Nursing, Psychology, and the Arts (Art, Music, and Theater).

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* These differences were tested for significance, using a two-tailed t-test. Alpha level was set at $p < .05$.

Seniors

In the Senior Evaluation Survey, students applying for graduation were asked to rate the amount of growth they had achieved on a five-point scale, ranging from none to very high, in the following five categories: Intellectual, Social, Personal, Educational, and Vocational/Professional. Further evaluations were made (using the same scale) on the amount of progress made in particular abilities and attributes, as well as on the impact of courses taken both in and outside the major field. In addition, the contribution of other activities,such as the library, cultural events, on-campus housing, to the five areas of growth were assessed. In all, there were 160 items in the survey. In the last three years, response rate has varied from 49 to 84%.

When looking at the overall responses of seniors to the various questionnaire items, no patterns had been evident. All students appeared to be rating most of their progress as average. The Departmental Profiles, however, revealed distinct differences among majors in the amount of perceived progress and impact of courses both in and outside the major.

The strongest contrast occurred between the Business and Nursing majors. Figure 1 illustrates the dissimilarity of these two profiles. The only items appearing on the graph are those to which both groups of students responded in a significantly different manner,when compared to the remainder of the seniors, in at least two of the three years studied (1976-77, 1977-78, and 1978-79). There are additional items in which one of these two majors differed significantly from the total sample, but the other did not. For example, Business Majors alone ranked themselves higher on "Quantitative thinking" than the remaining seniors, and Nursing students uniquely rated

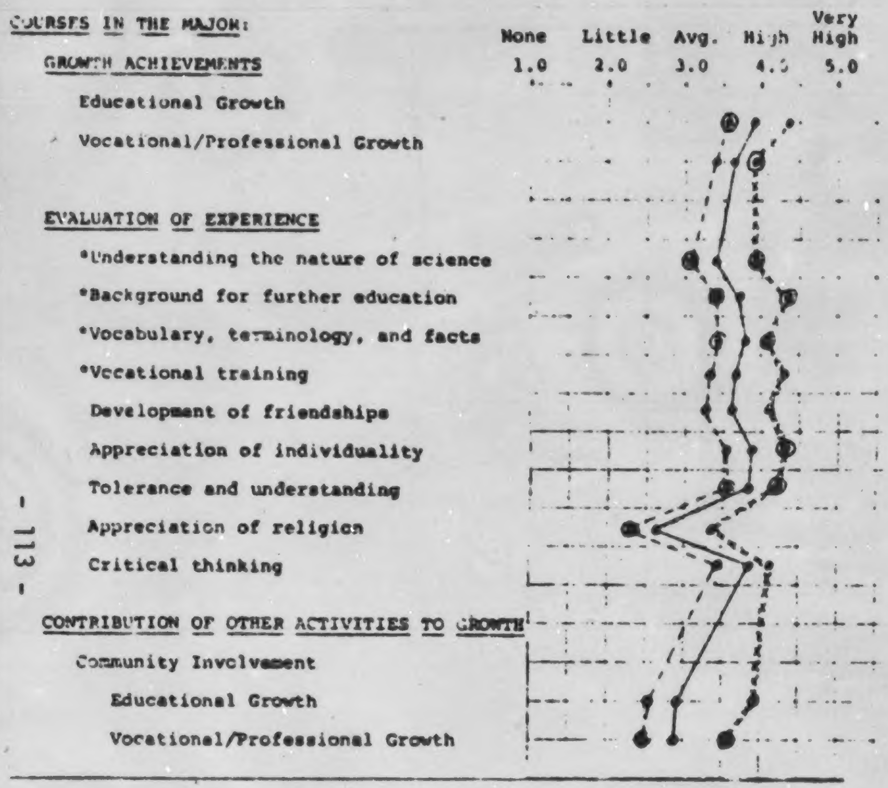

Figure 1. Contrasting Profiles of Two Groups of Seniors
Nursing vs. Business
Profiles contain items where responses were significantly ($p < .05$) different from the remainder in two of the three years studied. A circle (●) indicates the significance in all three years. The years covered are 1976-77, 1977-78, and 1978-79. Plotting is based on 1977-78, if available, otherwise 1978-79.

* Also significant when rating the overall college experience.

Business ----   Mean ——   Nursing ·····

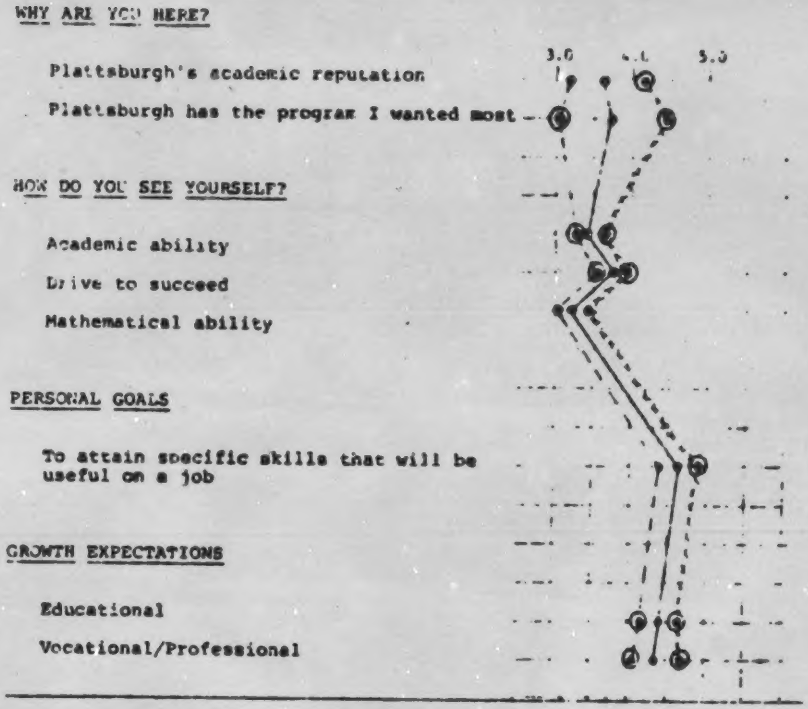

Figure 2. Comparison of profiles of new Freshmen who have not chosen a major and new Nursing students.

A circle (●) indicates the significance in all three years.

Undeclared ----   Mean ——   Nursing ·····

courses in their major as having contributed significantly more to their "Reasoning ability" than did their classmates.

Some of the other departments included in the current study (e.g., Biology and Psychology) revealed similar deviations from the mean, although not to the same extent. The number of differentiating items is smaller, but the discipline orientation is still clear. As an example, the Psychology seniors ranked themselves lower than average on Vocational/Professional Growth Achievements and Vocational Training, as a result of the overall college experience. The Biology seniors rated the contribution to Social and Personal Growth of courses in their major field lower than the average (as did the Business students), but ranked themselves much higher than all the others (including Nursing) on "Understanding the nature of science, experimentation, and theory."

These findings suggest the validity of the survey instrument because, in most part, they match intuitions one would have about the kinds of teaching goals; and, therefore, the expected progress students in these particular major fields should make in these abilities. The fact that our students are able to rate themselves differentially on the items and do not mark randomly, or worse yet, mark consistently all the items as "average" lends credence to the inferences that can be made from this survey about value-added. The responses of the seniors majoring in Art, Theater, and Music, when combined into a group designated "Arts," yielded more evidence to support this assumption. As one would expect, the Arts Majors rated their progress in "Aesthetic sensitivity" well above the average. "Cultural events (e.g., Art Exhibits, Plays, Speakers, etc.)" were also judged to have contributed to their Intellectual, Educational, and Vocational/Professional

Growth to a significantly higher degree than the average.

Freshmen

Differences in Senior appraisals are provocative, but even more interesting, perhaps, are the variations exhibited by the entering freshmen. The Freshman Survey contains a variety of questions. There are sections entitled General Information, External Support, Your Decision to Matriculate, Why Are You Here? Leisure-time Activities, How Do You See Yourself? Personal Goals, and Growth Expectations. In total, there are 117 items. The questionnaire has been administered during the Summer Orientation Program. Fortunately almost 90% of the new freshmen attend these sessions and the survey response rate of this group has been over 90% for the past three years. The following results are based on freshmen who entered in the Fall of 1977, 1978, and 1979.

Again, as with the seniors, the sharpest contrast, as well as the clearest "picture," emerged with the Nursing students. This is undoubtedly due to the highly competitive, and, therefore, selective nature of the program. The entering Nursing freshmen had significantly higher high-school averages and SAT-Verbal Scores, as well as other characteristics that differentiated these intensely vocationally-oriented students from other new students. Figure 2 illustrates the differences between the typical Nursing student and a new freshman who has not yet chosen a major. As with the seniors, only items significant in at least two of the three years are displayed. The typical undeclared major appears to lack vocational orientation and the drive to succeed. They correctly see themselves as having lower academic, reading, and mathematical ability. They also judge their persistence to be below average. This latter characteristic is consistent with

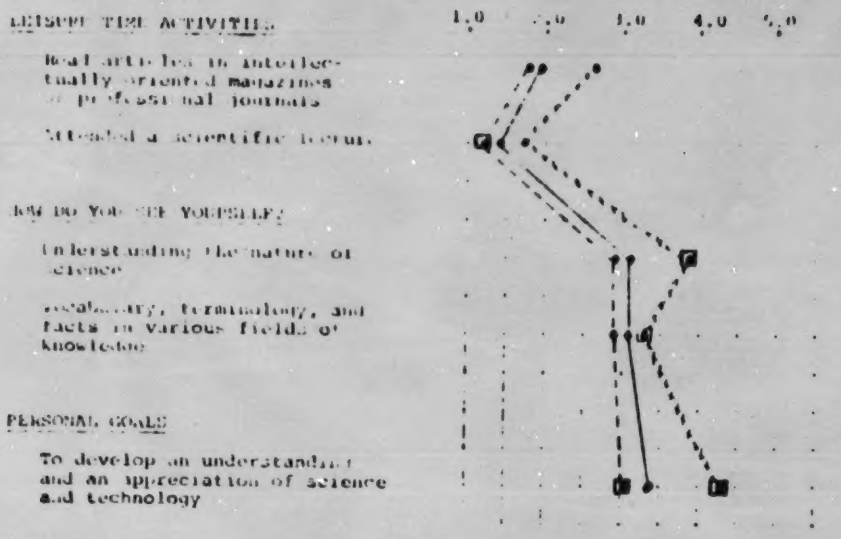

Figure 3. Comparison of Biology and Business Freshmen.

Items shown are those where there is a significant ($p < .05$) difference in at least two of the three years 1977, 1978, and 1979. ▣ indicates a replication in all three years. The 1978 data is used for plotting when available, otherwise 1979.

Business - - - - Mean ——— Biology • • • • •

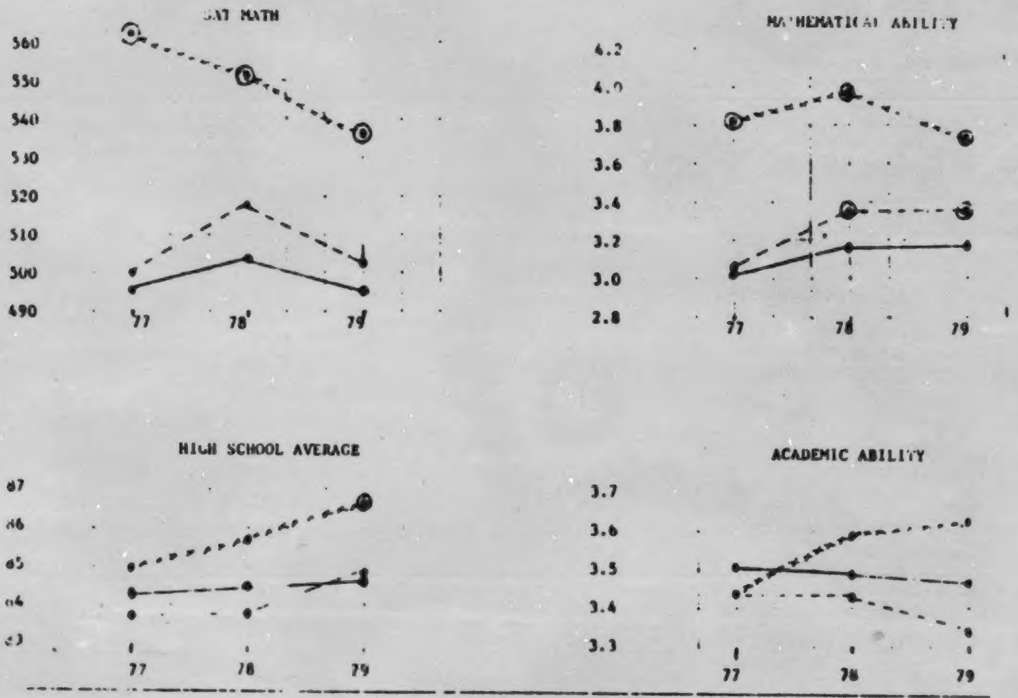

Figure 4. Academic ability measures and self-ratings of Business* and Accounting majors.

◉ indicates significantly ($p < .05$) different from the mean.

* Management, Marketing, or Multi-national Operations.

Business — Mean ——— Accounting • • • • •

the higher rate of attrition among the undeclared majors and the higher likelihood that students in this group will be academically dismissed (Green and Morlock, 1978). Their personal goals are not concerned with attaining specific skills nor meeting the academic requirements for entering graduate school, but they do see college as a way of improving their chances of making money! They have low expectations for both their educational and vocational/professional growth.

Although the Nursing and Undeclared Majors share the largest number of items with significant differences from the total sample, students in the other three fields responded uniquely and characteristically to some of the items. For example, the Business and Biology freshmen present differing profiles (Figure 3). Their scientific interests primarily account for the split between these two majors. Many of the items rated higher by Biology Majors were also rated higher by Nursing students, such as "Academic ability" and "Drive to succeed." Similarly, the Undeclared Majors shared some items with the Business Majors, in particular, the desire to "Improve (their) chances of making money."

An interesting spin-off of the study of departmental differences was the discovery that within the Business Major are two very distinct subgroups. It appears that there is the same principle operating as with the entire class, i.e., looking at the major as a whole obscures many of the more discriminating characteristics of the two different types of students choosing the field. Figure 4 displays two measures that tend to differentiate the more quantitative Accounting student from other Business Majors interested in management, marketing, or multi-national operations. Of particular interest are the extreme differences in mean SAT-Math scores between these two groups. Figure 4 also shows the self-rated mathematical and academic ability of these students. Clearly the Business and Accounting Majors properly indicate their relative mathematical ability, and Accounting Majors do indicate their rising level of performance when rating their academic ability. The existence of significant positive correlations between actual scores and ratings on the various academic abilities confirms these observations.

Discriminant Analysis

Previous analyses have demonstrated that the individual programs studied here can be differentiated from all other majors as a group. Several questions remained unanswered by these analyses, however. "Could the programs be differentiated from each other?" How did variables combine into dimensions, and which combinations were the best discriminators or predictors of membership in a group, or major?" A multiple discriminant analysis was performed on the 1977 senior and 1977 freshman responses, in order to address these questions.

Table 1 shows the results of the discriminant analysis performed on the seniors' ratings of the contribution of courses in the major to various areas of development. Overall group differentiation was significant, as were all four discriminant functions. The four functions were identified as 1) understanding science-aesthetic sensitivity, with Biology and Nursing falling at opposite ends of this continuum; 2) a social-vocational dimension, which also discriminated Nursing from Biology; 3) an aesthetic sensitivity-humanistic factor, discriminating Arts from Business Majors; and, 4) a social-personal development dimension, which seems most related to Psychology Majors and least to Arts and Biology Majors. In addition to the

Table 1. Comparison of Results of Discriminant Analyses on Comparable Senior and Freshman Items.

Variables	N	Senior- Contribution of Courses in Major Discriminant Funtions* 1	2	3	4	Freshman- Initial Levels of Ability 1	2	3	4	N
Personal development				.30	.33					
Social development			.54		.41	.37				
Tolerance and understanding			.40	.35				.52		
Appreciation of religion			.36	.38						
Awareness of different philosophies			.42	.38						
Literary acquaintance								.41		
Aesthetic sensitivity		-.40		.65		.66	-.44			
Writing and speaking ability								.41		
Reasoning ability								.54		
Ability to see relationships among ideas								.31	.32	
Critical thinking ability								.30	.36	
Understanding science		.65					.56	.34		
Quantitative thinking ability								.32		
Background for (or interest in) further education in professional field		.39					.39			
Socio-economic status			.41							
Vocabulary and facts in various fields								.36		
Vocational training			.46		-.31					
Continuing education				.35						
Root (% variance explained)		38	28	25	8	34	31	14	7	
Group Centroids	N									N
Arts	24	-.64	1.19	2.26	.30	1.76	-.27	1.53	-.08	24
Psychology	60	.20	.93	1.35	.99	1.18	.08	1.29	.68	41
Biology	47	.87	.33	1.17	.38	.21	.93	1.56	.24	47
Nursing	77	.77	1.78	1.22	.55	.89	.47	1.24	.20	93
Business	133	-.11	1.19	.71	.53	.73	.23	1.13	.14	88
Undeclared	--					.90	.16	1.56	.27	137
Group differentiation	Wilks lambda = .288 sig p < .0000					Wilks lambda = .564 sig p < .0000				

*Only functions significant at $p < .05$ are shown.

ability of these variable combinations to discriminate between majors, all but five of the 20 individual variables had significant F ratios. Similar results were found, using senior ratings of the amount of progress achieved in these areas, due to the overall college experience.

These analyses again show that seniors, in the five curricula studied here, have rated their overall college experiences and impact of courses in the major differentially, and in areas consistent with goals one would expect departments to have adopted. The fact that clearer patterns emerge from analyses of senior ratings of impact of courses in the major leads us to agree with Astin (1977), who contended that "affective changes may be attributed in part to the college experience, rather than simply to maturational factors."

A multiple discriminant analysis was also performed on the six freshman groups, using items comparable to those used in the senior analyses (Table 1). Results most closely resembled those from senior ratings of the overall college experience. The similarity of the functions discovered for seniors and freshmen, in this cross-sectional study, suggest that intensification of initial differences is the most probable mechanism of change occurring as a result of college experience. Those groups that began with higher ratings on "Aesthetic sensitivity" and "Understanding science" also indicated that they had made the most progress in these areas. The fact that freshmen in those majors, who indicated a higher interest in further education in some professional field, rated their progress in "Background for further education" as greater, together with the emergence of the vocational training-improved socio-economic-status function, suggests that seniors are achieving goals consonant with their intended professions.

A pilot longitudinal study, comparing ratings of initial characteristics and goals with senior achievements for the Class of 1979 as a whole, has added further support to these hypotheses. Significant positive correlations were found between ratings of certain goals and later achievements, particularly vocational goals. In addition, initial levels of ability were significantly correlated with later achievement in at least half of the abilities assessed.

Summary

The data reported here describe the freshmen with no major declared and typical undergraduates majoring in five diverse disciplines (Biology, Business, Nursing, Psychology, and the Arts) using freshman surveys, senior surveys, and ability measures. The identification of the dimensions that discriminated between these groups demonstrates that students with varying programmatic interests do respond differently to the questionnaire items, both as entering freshmen and as graduating seniors, and that these differences are consistent with notions one has about the areas of study. Thus, looking at senior perceptions of progress at the programmatic level provides a better measure of college impact than is obtained by pooling the responses of the entire class. Further, the fact that students rate the impact of courses in and outside the major differentially suggests that academic programs and courses per se are having some effect on the student's growth.

The question remains: "Are these self-perceptions of change a valid index of value-added?" The results of this study lend at least face validity to these measures. However, two other possible explanations for the diversity of responses between programs exist. First, seniors may be responding differently simply because of their original differences as freshmen. After surveying the research on this subject, Feldman and Newcomb (1970) have concluded that this is not the sole explanation, but that "differential experiences in the several major fields do have impacts beyond those attributable to initial selection into those fields." Current longitudinal studies will provide a more direct measure of change and may help to answer this question. Second, seniors may be merely accommodating their responses to the assumed goals of their curriculum, rather than indicating the extent of their own progress. Correlational studies between the items on the survey and "hard" achievement measures may substantiate the validity of the students' perceptions. A preliminary investigation, using the Undergraduate Program Test in Biology, highlighted the difficulties surrounding the administration and analyses of a standardized test. The high costs have temporarily suspended efforts in this direction.

Two observations from this research suggest that seniors are responding with some accuracy. Confidential peer-administered interviews with individual students indicate that their ratings are consistent with their verbal descriptions of their experiences. Freshmen's perceptions of their academic abilities closely reflect their actual measured abilities, using SAT scores and high school averages. This implies that seniors also may be able to accurately rate their progress in various abilities. Identification of the appropriate hard measures(s) of achievement with which to correlate the Senior Survey remains the most perplexing and expensive endeavor. The articulation of specific college-wide and programmatic objectives would enhance the assessment of progress towards these goals. The college is currently committed to a continuing search for solutions to both of these problems.

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A Software Approach to Unscheduled Instructional Hours and Accounting for Their Effect on FTE's and Facilities Utilization

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Introduction

The purpose of this paper is to describe the development and uses of a software approach that the State University of New York at Albany implemented in Fall, 1976 to manage the instructional workload data base. The package has allowed the campus to insert into the workload file information on required but unscheduled instructional hours, thus resulting in more complete and accurate data. It is hoped that a description of the planning and implementation process will illustrate the ease, straightforwardness and benefits of this approach for an automated as well as manual operation.

History

The impetus for developing the approach at SUNYA was two-fold and first came during Spring of 1976 when I was in the process of confirming section enrollments and hours of instruction with department chairpersons. This confirmation process was one in which I engaged for every Fall and Spring semester. During the course of such conversations, comments were made along the lines of "What you have here is fine as far as it goes, but you know you are not describing our entire workload." "Not describing our entire workload" - almost everyone who has worked with faculty has probably heard something along those lines at one time or another. Required instructional hours were not being included in our workload reports. The Office of Institutional Research duplicates the Registrar's data base at a given point in time and we found that many courses eluded the scheduling process because they were hard to specify as to time and place or because they met at "To Be Arranged" times. Without concrete data as to day and time, automatic calculation of weekly faculty and student contact hours was impossible. Something was needed which would handle this type of instruction in a routine, systematic fashion.

In addition, during the Fall of 1976, SUNYA was one of several State University campuses included in an audit of the Central Administration Office of Capital Facilities. Among other things, we were being cited for underutilization of music practice rooms. This seemed absurd. We knew the music practice rooms received a lot of utilization. That was the problem: we knew or thought we knew what was going on and yet the data did not confirm our feelings.

Departments claim their faculty and students work hard: harder than the FTE's indicate and harder than the instructional facilities can always support. They argue that certain course offerings require more faculty contact hours than others and request additional faculty lines to support these courses. Social Welfare practicums and Art Studio courses are ones for which additional faculty are sometimes sought. It is asserted further that language labs, research labs, music practice rooms and other specialized facilities are used to the fullest extent possible, and that some students are being denied adequate access and are forced to utilize inadequate, substitute-types of facilities.

Internal and external management are receptive and sensitive to such complaints during budget request or resource allocation hearings and yet, the data are not available to support the claim. What recourse is open to chairpersons? What can be done to describe more fully the required instructional hours of faculty and students as well as the heavy usage of facilities? Can anything be done on a systematic basis to document this resource drain?

The Fall audit plus the comments of department chairpersons made us realize that a department-by-department analysis of unscheduled but required instruction was needed in order to supplement the Registrar's schedule and, thus, more completely and accurately describe the workload of our faculty and students as well as the actual utilization of instructional facilities.

Development of the Approach

One role of Institutional Research in the eighties will be that of the professionally-oriented, skilled analyst on the outlook for opportunities to promote the efficient use of scarce resources and to measure accurately the resources used. Institutional Research personnel should have the training, the expertise and the knowledge of data systems and how to describe academic functions in machine-readable format. They are the middlemen in a changing, chaotic academic economy.

Prior to Fall 1976, our office referenced about a dozen pages of penned notes on additional items to manually include in the workload data base. A manual approach is fine if you don't have a large volume of courses to work with. As time went on, however, insertion of known supplemental information into the data file consumed more and more time. If we were to canvass each department and attempt to establish a more comprehensive approach, a plan of action and systems support would be needed. Otherwise, the volume of data would be too large to deal with in a timely fashion.

A FIRST step in establishing a software approach is to conceptualize a philosophy of importance. Why go through the work and effort if you're not sure about the benefits. Institutional Researchers work frequently with top level campus management and serve on many committees. It is our responsibility to point out the uses and benefits of complete, accurate and timely data for such things as allocation decisions, space reassignments, and under/over staffing reviews.

Data from each SUNY campus is used by the Central Staff Office of Institutional Research and Analytical Studies in publication of the STATISTICAL

ABSTRACTS, a summary of instructional costs and faculty instructional workload for State-operated postsecondary educational institutions in New York State. Data is also reviewed and used by the New York State Division of the Budget and the Department of Audit and Control. It is important that these audiences have as complete a picture as possible of faculty workload, costs of instruction, and utilization of instructional facilities.

Many individuals must be involved whenever any project such as this is undertaken, and you will be asked what is in it for them. The need for and benefits of the project must be conceptualized so they can be conveyed. If you're not sure of what you're doing and why, this will come across and you will not get the results you need.

SECOND, before devoting a lot of time to planning and research, you should discuss the general concept, logic, and desired implementation date of what you would like done with the manager of your programming unit. Be prepared to give a few examples of things you would like to see automatically added to your data base. One straightforward example would be the addition of information describing the required hour-a-week additional practice required in the language lab for French 130B students.

Before medium-scale enhancements are attempted, you should have a general understanding of the limitations of your systems and hardware. Find out if your project is feasible and whether it can be designed, constructed, tested and implemented within the next six months. If not, you may want to postpone researching candidate departments and scheduling meetings with chairpersons because course requirements may change slightly over a six-month period.

THIRD, do your homework. Know your information systems, courses, operating procedures and formulas.

a. Review available program documentation and flowcharts.

b. Know the required local format and uses of your data.

c. Know the systems that your system is input to. This may influence the way you construct your software option.

d. Study campus bulletins and catalogues. Try to find out from the catalogue whether extra work might be required in addition to regularly scheduled lectures. Then refer to your Registrar's schedule to determine whether this additional work is formally scheduled. Flag those courses that may qualify. Be especially alert to the possibility of being able to describe additional required instruction for foreign languages, art studios, psychology, music, health professions, and research courses in the physical and social sciences. Also keep in mind the extra things that were included for other departments to determine whether something similar might be done for the department you are reviewing.

e. Prepare for the meetings you will schedule with chairpersons. This includes deciding on what questions you should ask and how you should phrase them. Write them down. Decide how you will record the information.

f. Format is important. Decide how you will establish the rules for additional instructional activities, how you will confirm their accuracy with chairpersons, how you will convey the data and logic to your programmer for implementation, and how and where the supplemental information should appear on reports produced from your data base.

Description of Data Base

Our local workload data base was constructed to conform with the requirements of the State University Course and Section Analysis file. The data base had to contain information on not only credit course value and enrollment, but also hours of instruction, location, and faculty. This data was needed to support State-wide space utilization studies, personnel utilization summaries, calculation of instruction costs, etc.

To visualize how the workload file is organized, think of a report listing each department by school and all courses offered within each department. The report is arranged by page and line number. At least one line is needed to describe every section of every course. Sometimes, there are two, three or more lines describing the section. When supplemental information is created by the software for a particular section of a course, this information is created in the form of a new line appearing directly after the section to which it applies. Lines and pages are renumbered during the execution of the software to accommodate and record new data in exact page and line number sequence.

There are eighteen major fields for each line in the report. As the data file which produces the report is being created, the eighteen fields are derived from one of four sources. We depended on other offices for our data. The Registrar's, Personnel, Budget and Facilities Offices played the most important roles in our data collection effort. To create our workload file, we drew upon the data bases of these offices. The Student Permanent Record, maintained by the Registrar's Office, contained unit records for each student and provided demographic as well as registration information. A Course Master File contained such things as the discipline code, credit value authorized, and department account number. The Personnel-Budgeting Information System provided the social security number of the instructor. The Semester Section File, also maintained by the Registrar's Office, contained the location, days and times that the course meets. Once the local file was created, it had to be file maintained in order to reflect the supervisors of independent study students, changes in meeting times or location, faculty reassignments, etc.

When we were satisfied with the integrity of the data, we utilized an option in our maintenance software to calculate weekly faculty and student contact hours. The software option contains the logic and instructions on how to deal with the data in the Table of Rules. The Table is nothing more than a list of courses along with department numbers specifying the number of contact hours and type of facility that should appear with the course. During the execution of this option, the Table of Rules is accessed and used. A match between the data base and the Table is done on the basis of course abbreviation and department number. For those courses not contained in the Table, scheduled days and times were read and weekly faculty and student contact hours computed from this. Any course which appeared on the Table was treated according to the instructions specified.

The use of this option involves more than calculation of contact hours for what turns out to be pre-existing lines in a report. New, complete descriptors of instruction are actually created and inserted into their appropriate location in the file. All data for a new (insert) line are either created from information in the Table or are duplicated from the existing file. The eighteen major fields for each line are listed on the following page. The data source for insert lines is indicated in Columns A, B and C.

The size of the file increases by about fifteen percent after the software option has been used. Through the use of this option, contact hours per FTE faculty have risen from 11.89 in Fall 1975 to 12.53 in Fall 1978. Total FTE faculty was 811 in Fall 1975 and 747 in Fall 1978. Contact hours per FTE student have gone from 15.79 to 16.85 during that same period. This is significant considering we had 13,428 FTE students. For those departments where students are required to do substantial work in specialized facilities outside of formally scheduled class periods, inclusion of this supplemental information dramatically affects their recorded utilization of instructional facilities. The following example of contact hours for courses before and after the option illustrate the impact of this approach.

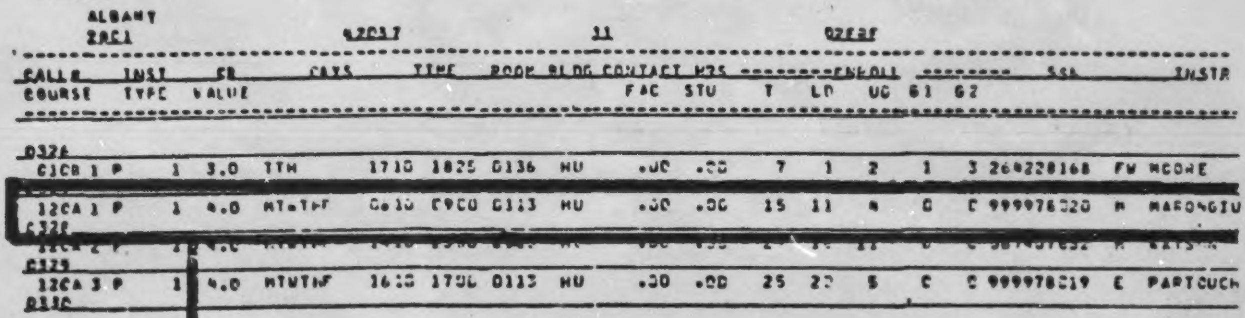
Source of Data for New Lines (Inserts)

	Field Name	Source of Data A Table	 B Existing Line	 C Not Needed
1.	campus number		x	
2.	department account no.		x	
3.	discipline code		x	
4.	course abbreviation		x	
5.	course level		x	
6.	section number		x	
7.	instruction type code	x		
8.	term code		x	
9.	credit value			x
10.	days of instruction			x
11.	beginning & end times			x
12.	space required code	x		
13.	room			x
14.	building	Campus or Off-Campus is printed		
15.	weekly faculty COH	x		
16.	weekly student COH	x		
17.	enrollment & level		x	
18.	ss# & faculty name		Existing or Not Needed, depending on type of instruction. Auto-tutorial, for example, requires no faculty.	

(COH = contact hours)

FRENCH

Before



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COURSE  TYPE  VALUE                                 FAC  STU   T   LD   UG  61  62
---------------------------------------------------------------------------------------

0326
 010B 1 P    1  3.0  TTH       1710 1825 0136  HU   .00  .00   7   1    2   1   3 264228168  FW MOORE
 120A 1 P    1  4.0  MTWTHF    0810 0900 0113  HU   .00  .00  15  11    4   0   0 999978320  M  MARONGIU
0328
 [illegible]
0329
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0330
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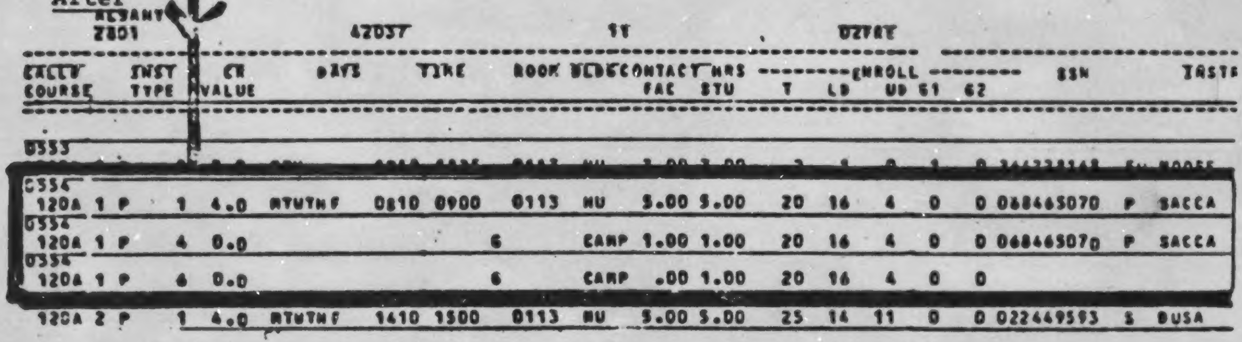
After



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---------------------------------------------------------------------------------------
CALL#   INST   CR        DAYS     TIME     ROOM BLDG CONTACT HRS ---------ENROLL --------- SSN       INSTR
COURSE  TYPE  VALUE                                   FAC  STU    T   LD   UD  61  62
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0354
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0354
 120A 1 P    4  0.0                           6  CAMP 1.00 1.00  20  16   4   0   0 068465070  P  SACCA
0354
 120A 1 P    4  0.0                           6  CAMP  .00 1.00  20  16   4   0   0
 120A 2 P    1  4.0  MTWTHF    1410 1500   0113  HU   5.00 5.00  25  14  11   0   0 022449593  S  BUSA
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The instructors and enrollment will be different because we had to use copies of reports from two different semesters. Please disregard the enrollments and direct your attention to the additional types of instruction and contact hour information being inserted.

Implementation

Implementation involves meeting with department chairpersons, communicating with programmers, reviewing test data for accuracy, documenting the software, and getting it into production. In meeting with chairpersons, set the stage. Explain why you requested the meeting and how you think you can more accurately and completely portray the department's instructional workload. Transmit in writing the courses, data and rules to your programmer as soon as possible. Schedule a meeting to review the material and decide on a data base against which to test. We used a duplicate of the preceeding semester because we were familiar with the data and how it should look.

The programmer/analyst regularly assigned to the Office of Institutional Research was assigned to us for this project as well. During the Summer and Fall of 1976, we held alternate meetings: two with chairpersons and then one with our programmer/analyst. By mid-term, we had compiled a table of courses for which special contact hour rules would apply and had developed the instructions and the logic, that is, the software to deal with more than ninety percent of them. With further effort, we were able to utilize the software approach to include unscheduled, required instructional hours in the data base by the end of the semester and in time for finalization of our file with Central Administration. Please keep in mind that the supplemental data we are talking about are required instructional hours, that is, activities that are part of the instructional process. This data falls within the parameters of official guidelines on instructional activities and excludes such things as travel time and study hours.

Nothing ever stays the same, however, and an important specification of ours from the beginning was that the Table be constructed in such a way that we could file maintain the data values ourselves. The type of maintenance capability we had envisioned was straightforward. If required additional hours changed from five to six per week, we wanted to be able to record the change on a file maintenance sheet, send it down for keypunching, and have our Table updated. As data bases developed and became more integrated, we had envisioned some day entering the changes onto a terminal for on-line updating. Pressure from other users of programming services has been so great, however, that we have not yet been able to establish an on-line capability.

At the present time, there are 354 courses, out of about 1,700 offered each semester, for which special calculations are performed or for which supplemental information is created. Keeping up with change, while not easy, requires just a little planning, follow-through and time. It's a good idea to check with about half the departments every semester to determine whether the old rules still apply and whether new courses have been established that should be added to your inventory. Another primary source of information is your Registrar's Office.

The foregoing procedures can be used in a large university or small two-year college setting, in a publically financed or private institution, and in an automated or manual operation. The basic principles of planning, research, design and implementation would be similar wherever the procedure is adopted. If it's to be incorporated into a manual operation, results of interviews with chairpersons still need to be recorded and summarized. A Table of Contact Hour Rules is a useful summary device.

Our approach to managing required, unscheduled instructional hours is clear and simple and requires only a modest investment of staff time. That staff time, however, must be organized, planned and documented. We have found that a structured approach produces the highest yield.

Uses of the Data

Our experience with the approach has been that it is useful but that its full potential has not yet been fully realized. The areas in which the supplemental data has been used, while not numerous, are still impressive and include the following:

1. Departmental ability to plan for some costly (in terms of low enrollments and thus low FTE's) major-required courses. A foreign language department was facing a situation of declining majors and decreasing FTE's. Lower division major-related courses exacted a demanding contact hour load: five hours of lecture a week plus two hours a week in the language lab. After analyzing the characteristics of the more popular sections, the chairman rescheduled some courses into popular periods, increased registrations in each of these, but reduced the total number of sections offered. He then rearranged the teaching assignments of his staff and broadened the scope of his department's offerings through interdisciplinary and community-interest courses. In Fall 1978, the department had 77.6 FTE students and 6.81 FTE faculty for a student/faculty ratio of 11.39. The foregoing changes resulted in 101 FTE students and 6.9 FTE faculty for a Spring 1979 student/faculty ratio of 14.64.
2. The ability to document during budget hearings the high workload of custodians and the need to avoid deferred maintenance. The rapid growth of higher education in the 1960's and early 1970's witnessed the expenditure of billions of dollars for the construction of new educational facilities. These structures have aged and monies are now needed for major maintenance and repair. During these times of

fiscal austerity, it is imperative that decision-makers have accurate and complete data when reviewing maintenance and operations budget request. Contact hours cause wear and tear on our structures. If we don't fully state the use, we will never receive full support for maintenance.

3. The ability to demonstrate the need for additional, specialized instructional facilities. The nature of several disciplines has changed dramatically over the past ten years. Our Psychology Department was housed in a structure conducive to the lecture mode of instruction but seriously lacking in laboratory facilities. Through documenting usage and need, the Albany campus was fortunate and secured significant amounts of rehab monies for a major alterations project.
4. The ability of the campus scheduling officer to provide for more efficient use of academic facilities because of the availability of more complete utilization data. By revising the schedules of certain courses, sufficient time can be reserved for students to use music practice rooms, labs and studios.
5. The ability to more effectively manage and re-allocate existing campus space. Most institutions are in a "no growth or modest growth" situation as far as facilities are concerned. With limited resources and multiple, sometimes conflicting demands, presidents, vice presidents and/or space management committees must have accurate data for informed decision-making. The contact hour approach helps supplement the official schedule and provides managers with more complete information for intelligent decision making.

It is our responsibility to know as completely, accurately and timely as possible, the main characteristics of the instructional process. The contact hour approach provides a measure of help.

FACULTY ACTIVITY ANALYSIS - GROUP SIMILARITIES AND DIFFERENCES

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State University of New York at Brockpost

Introduction

In late 1970 and early 1971, the academic and administrative vice presidents along with selected administrative staff, of the State University College at Brockport began an investigation into the possibility of developing a survey instrument that would quantify those activities that are associated with an academic appointment. This concern for evaluation of how our academic resources were applied stemmed from one very important fact. Budgets were being tightened and reliable quantitative information was needed to effectively manage the limited academic resources of the college.

Instrument Development

After several months of design the committee of academicians and staff developed a document entitled "The Resource Allocation Survey". The Committee, to further justify its position, sought institutional acceptance of the survey on the basis of five reasons/uses for the information.

Reasons For and Uses of the Resource Allocation Survey

1. Develop a sound basis for instructional program planning and justification.
2. Demonstrate that we are concerned and responsible stewards of public monies.
3. Provide a basis for resource reallocation.
4. Provide the departments with experience in self analysis that will help them develop their own recommendations for improvements and act upon them.
5. These data and quantitative academic judgement will continue to be critical criteria in resource allocation and use.

The resource allocation survey was comprised of eight forms. These forms solicited information on the level of instruction, mode of instruction, class size, credit hours, departmental costs, course program applicability, and faculty workload. The allocation of workload form was the predecessor to Brockport's Faculty Activity Analysis Survey. There were many inherent deficiencies in this initial attempt to quantify faculty activity and cost. Those difficulties were expressed in the following recommendations for improvement. (Gennarino, 1972)

1. It is highly desirable that more data be generated centrally and insofar as possible all of the computations be done centrally.
2. The definitions of research and service must be sharpened with specific descriptions of the activities which fall in each area. If this is accomplished it should eliminate the ambiguities in the third area, instruction.
3. We must convince Deans and Department Chairmen that the information produced is worth the effort in that it receives consideration in allocation of resource decisions.

To implement these recommendations various academic activity collection forms were reviewed. The primary objectives of reviewing these forms were to analyze formats used to collect the information by percent instead of hours, expand the categories of faculty activities, and reduce the number of forms and the amount of information that faculty and department chairpersons were required to complete.

From this review it was decided that the Faculty Activity Analysis Survey form designed by the National Center for Higher Education Management Systems at Western Interstate Commission for Higher Education, Boulder, Colorado, (NCHEMS) was most applicable to our objective. However, their form was very time consuming to complete and requested the reporting of hours worked. While maintaining the design philosophy of the NCHEMS Faculty Activity Analysis Survey, Brockport developed its own faculty activity analysis instrument. It incorporated many of the categories of the NCHEMS Faculty Activity Analysis Survey but substituted their request for disbursement of time by hours worked with a request for work hours to be reported as a percent of workload. Percent of workload reporting was critical to the success of the faculty activity analysis survey. It was learned from the completion of the Resource Allocation Survey that faculty had extreme difficulty estimating time devoted to an activity in relationship to the amount of time in a day or week. This change in strategy of requesting percentages to be reported in combination with an estimated work week resulted in a much more realistic perception of time.

This new form required reporting the percent of workload in sixteen categories. Those categories and definitions were:

Faculty Activity Analysis - Category Definitions

1. Scheduled Teaching - All activities related to numbered courses (degree and non-degree) in the current term such as lecturing, tutoring, supervising laboratory course work, evaluating student efforts, supervising assistants, etc.
2. Unscheduled Teaching - All teaching-related activities not associated with numbered courses.
3. Academic Program Advisement - All activities related to giving advice to students concerning course scheduling and academic programs.
4. Course and Curriculum Research and Development - Activities related to teaching outside the current term.
5. Media Development - Activities related to the development of video tapes, slides, films, tapes, etc.

6. Specific Projects - Should have external end products; all research, scholarship and creative work activities directed toward a definite end product.
7. General Scholarship for Professional Development - All research, scholarship and creative work activities related to keeping current in a professional field.
8. Faculty or Department Administration - All supervisory or managerial activities.
9. Departmental Participation - All activities related to active participation on departmental (or equivalent unit) committees.
10. College Participation - Task Forces, Faculty Senate, Special Committees, etc.
11. Student Oriented Service - All activities related to general contact with students.
12. Professional Service and Advice - All non-administrative activities related to performance of assignments in, or consultation to, such units as the library, counseling center, health clinic.
13. Institution Oriented Service - All activities related to fulfilling institutional requests such as supplying data.
14. Unproductive Extracurricular Service - All activities related to tasks currently performed but that should be carried out by competent service personnel.
15. Professional Organizations - All activities related to participation in professional organizations and meetings.
16. Paid Professional Service - All activities related to paid professional advice, consultations, and services to external agencies.

The justification for the Faculty Activity Analysis project differed only slightly from the justification of the Resource Allocation survey. The justification is best described in the introduction of the institutional reports compiled from the Faculty Activity Analysis data. (Dube' and Oshier, 1979) Though the variety of missions, activities, and constituencies that characterize our academic community is immense, each individual faculty and department relies to a great extent upon its faculty to motivate students, transfer knowledge, and/or perform research. It is upon the collective shoulders of the College's faculty that the primary burdens of instruction, research and public service fall. Because the faculty play such a vital role within the College, it is vital that the college be able to understand the allocation of faculty time to different institutional programs. This allocation has far-reaching implications on the institution's ability to perform its designated missions.

The purpose of the study was three-fold:

1. To develop refined and standardized procedures for analyzing faculty activities.
2. To develop and refine techniques for collecting and reporting data.
3. To eliminate the costly and time-consuming duplication of data gathering for various reports required by Central Administration.

The explicit justification for each year's study rested upon two basic assumptions;

1. That distributions of faculty workload are related somehow to the quality of the learning environment created within the College.
2. That distributions of faculty workloads influence the cost of producing the learning environment.

Thus, the Faculty Activity Analysis is seen as a tool to allow investigation of the cost of higher education at Brockport. While the results of this survey do not express absolute values, they do express excellent approximations of actual costs. The data, at least, presents the relative difference in costs between units. The results of the Faculty Activity Analysis should serve a variety of uses, such as:

1. Discovering what activities consume faculty time and energy.
2. Detecting trends.
3. Identifying inequities in load.
4. Obtaining assignment guidelines.
5. Establishing measures of output to support budget requests.
6. Supporting changes in staffing and curriculum requests.
7. Analyzing the range of responsibilities among faculty members.

A number of analytical questions might be asked in evaluation of the data. Institutional planners and administrators may need as well as desire data concerning the following questions:

1. Are faculty efforts appropriately applied to the objectives of the College?
2. How does the College know if the desired results have been obtained?
3. Is there a controllable relationship between faculty activities and the desired results such that a decision-maker can redistribute faculty resources to obtain the existing level of results with less overall resources or increase the level of results by better utilization of existing levels of effort?
4. Do the relative prices of the various resources indicate that some substitutions among resource groups can achieve the same level of results at lower costs?
5. What can be done to improve the products of faculty analyses?

With the new form established we continued to collect the information on a yearly basis, making only slight modifications to the form. While the yearly information was providing guidance in the allocation and reallocation of resources it was still a historical management resource for decision making. To transform this historical reporting document into a projection or manipulation resource instrument we needed a means by which the historical facts could be used to design future allocation of resources. The decision was made to identify a set of comparable populations overtime upon which to conduct a series of analyses.

Data Base

Faculty Activity Analysis surveys from 1972 through 1978 formed the total information pool available. Since the first two years were a period of experimentation, they have been omitted from the current analysis. The forms have remained the same from 1974 through 1978, and this comparability is the major advantage of the data base.

Part time faculty have not been included in this analysis because of the different functions they perform and the different proportions of time they spend on various activities. Faculty with ranks of Instructor and Lecturer have also been excluded because of their extremely small numbers.

The remaining data for analysis were the Assistant, Associate, and Full Professor ranks from 1974 through 1978. Population sizes were:

	1974	1975	1976	1977	1978
Assistant	150	151	139	132	102
Associate	129	136	135	136	127
Full Professor	103	113	113	107	114
Total	382	400	387	375	343

These 1,887 surveys have been analyzed and the methods and results are presented in the following section.

Analysis and Results

Factor Analysis

This technique was used to analyze the Faculty Activity variables to discover the extent of redundancy present. Principal components and factor analysis procedures from the Statistical Package for the Social Sciences (SPSS) (Nie, 1975) were used. Varimax rotations were performed at the end of each of these analyses.

Examination of the correlation coefficient matrix preceding these factor analyses showed extremely low relationships among the variables. The highest r value did not exceed 0.42. Thus, it was not surprising that the principal components and factor analysis procedures did not provide meaningful results, the first factors explained 10.9 percent and 19.7 percent of the total variance, respectively. Rotated factor matrices did not align more than one variable on any one factor.

The conclusion was that the Faculty Activity variables were independent and could be used directly in the discriminant analysis without any modifications.

Discriminant Analysis

The Faculty Activity data base was examined in two different ways. First, a series of analyses compared each of the faculty ranks separately throughout the 1974 through 1978 period. Second, a series of analyses tested the relationship among all three faculty ranks for each of the years. In all of these analyses, the aim was to develop significant discriminant functions that distinguished between the faculty rank and year groups being studied. The variables associated with each function were then used to develop more concise group profiles. As a validation of the discriminant functions, each of the individuals was grouped according to the discriminant scores. Actual and predicted group memberships were compared, and a percentage of correct groupings measured the rate of success.

The first series of analyses examined Assistant, Associate, and Full Professors separately from 1974 through 1978 to determine changes in each of these faculty ranks over time. The following tables present the major details of these three analyses, including explained variance and group profiles.

Separate Assistant, Associate and Full Professor
Discriminant Analyses from 1974-1978

	Function 1	Function 2	Total	Classification
Assistant	57.3%	28.8%	86.1%	28.6%
Associate	67.3%	23.9%	91.2%	23.7%
Full Professor	59.0%	25.7%	84.7%	29.6%

Assistant Professor
Discriminant Analysis Group Profiles (Mean Values)

Variable	1974	1975	1976	1977	1978
External Projects	11.0	9.6	7.8	7.8	8.7
Professional Development	7.4	8.4	8.8	8.7	9.1
Faculty/Dep't. Admin.	3.3	2.7	3.2	5.9	6.2
College Participation	1.4	1.8	1.2	1.4	1.9
Student Service	4.0	3.9	3.3	3.0	3.6
Institutional Service	1.3	1.5	1.4	1.8	2.0
Student Credit Hours	271.3	301.8	300.3	260.1	249.2

Associate Professor
Discriminant Analysis Group Profiles (Mean Values)

Variable	1974	1975	1976	1977	1978
Unscheduled Teaching	4.5	5.3	4.6	3.8	4.8
Academic Advising	3.8	3.3	3.5	4.2	4.6
Department Participation	4.4	5.3	4.6	4.5	4.3
Professional Service	1.4	1.5	1.1	1.0	1.3

Full Professor
Discriminant Analysis Group Profiles (Mean Values)

Variable	1974	1975	1976	1977	1978
Scheduled Teaching	39.0	40.6	43.2	45.2	45.3
Media Development	1.3	0.9	0.8	0.8	0.6
Department Participation	4.6	4.0	3.6	3.4	3.9
College Participation	1.5	1.8	1.9	2.0	2.7
Student Service	3.6	2.4	2.5	2.7	3.2
Professional Service	1.8	1.4	1.0	1.2	1.3
Hours Worked Per Week	55.7	56.1	57.8	53.8	55.8

These tables show that significant discriminant functions were developed and that there was a fairly high percentage of explained variance. Low classification percentages suggested that on a practical basis, it was very difficult to distinguish between each of the faculty ranks over time.

Some general observations are that Assistant Professors have shown a decrease in external project activity and in student credit hours generated. There has also been an increase in professional development, faculty/department administration, and institutional service activities. Associate professors have shown a general increase in academic advising activities. Full professors have shown a decrease in media development and an increase in scheduled teaching and college participation activities.

The second series of analyses examined all of the faculty ranks within each of the five years to determine if differences existed between ranks over time. The following tables provide the major details of these analyses.

Discriminant Analysis of Faculty Ranks By Year

	Function 1	Function 2	Total	Classification
1974	73.3%	26.7%	100.0%	50.3%
1975	71.3%	28.7%	100.0%	49.0%
1976	72.5%	27.5%	100.0%	44.4%
1977	72.0%	28.0%	100.0%	42.4%
1978	55.6%	44.4%	100.0%	42.0%

Discriminant Analysis Group Profiles (Mean Values)
1974

Variable	Assistant	Associate	Full
Unscheduled Teaching	5.1	4.5	3.5
Course Development	7.2	6.0	5.5
Media Development	0.8	1.0	1.3
Professional Development	7.4	9.0	9.4
Faculty/Dep't. Admin.	3.3	4.8	9.1
College Participation	1.4	2.2	1.5
Professional Service	1.7	1.4	1.8
Institutional Service	1.3	1.6	1.8
Paid Professional Service	0.5	1.1	0.5
Hours Worked Per Week	59.5	58.2	55.7

Discriminant Analysis Group Profiles (Mean Values)
1975

Variable	Assistant	Associate	Full
Unscheduled Teaching	4.6	5.3	3.7
Academic Advising	4.5	3.3	3.5
Faculty/Dep't. Admin.	2.7	4.6	9.8
Department Participation	4.9	5.3	4.0
College Participation	1.8	2.5	1.8
Student Service	3.9	3.1	2.4
Paid Professional Service	0.4	1.0	0.6
Student Credit Hours	301.8	253.7	249.9

Discriminant Analysis Group Profiles (Mean Values)
1976

Variable	Assistant	Associate	Full
Scheduled Teaching	44.9	42.7	43.2
Academic Advising	5.1	3.5	3.4
External Projects	7.8	10.3	10.6
Professional Development	8.8	8.0	10.2
Faculty/Dep't. Admin.	3.2	6.3	7.0
Department Participation	5.2	4.6	3.6
College Participation	1.2	2.0	1.9
Professional Service	1.5	1.0	1.0
Extracurricular Service	1.5	2.4	1.6
Student Credit Hours	300.3	283.6	238.6

Discriminant Analysis Group Profiles (Mean Values)
1977

Variable	Assistant	Associate	Full
Unscheduled Teaching	5.2	3.8	3.7
Academic Advising	5.0	4.2	3.1
Media Development	0.7	1.0	0.8
Department Participation	4.9	4.5	3.4
College Participation	1.4	2.6	2.0
Professional Service	1.7	1.0	1.2
Institutional Service	1.8	1.5	1.4
Hours Worked Per Week	56.4	56.9	53.8

Discriminant Analysis Group Profiles (Mean Values)
1978

Variable	Assistant	Associate	Full
Unscheduled Teaching	4.8	4.8	3.3
Academic Advising	4.6	4.6	3.7
Media Development	0.6	1.3	0.6
College Participation	1.9	2.3	2.7
Professional Service	1.7	1.3	1.2
Institutional Service	2.0	1.6	1.4
Professional Organizations	2.0	2.6	2.5

In 1974, unscheduled teaching, course development and hours worked per week decrease as the faculty rank increases. Media development, professional development, faculty/department administration and institutional service increase as rank increases. College participation and paid professional service are highest and professional service is lowest for Associate Professors.

Faculty/department administration increases as faculty rank increases in 1975. Student service and student credit hours decrease as rank increases. Unscheduled teaching, department participation, college participation and paid professional service are highest for Associate Professors, and academic advising is lowest for them.

In 1976, external projects and faculty/department administration increase with increasing faculty rank. Academic advising, department participation, professional service and student credit hours decrease with increasing rank, Associate Professors are lowest in scheduled teaching and professional development, and highest in college participation and unproductive extracurricular service.

Unscheduled teaching, academic advising, department participation and institutional service decrease with increasing faculty rank. Associate professors had the highest level of media development, college participation, and hours worked per week and the lowest level of professional service.

In 1978, college participation increases with increasing faculty rank. Professional service and institutional service decrease with increasing rank. Media development and professional organizations are highest for Associate Professors, while unscheduled teaching and academic advising are lowest for Full Professors.

The classification results for each of the five years are much more encouraging than in the previous analyses. This suggests that not only are these significant discriminant functions, but that they can be used in the practical application of grouping new individuals into the existing faculty ranks.

Summary

Some differences did exist between the activities of an individual faculty rank over a series of years and the changes did show some patterns. The lack of successful groupings meant that this is an area to be monitored in the future, but not one requiring a continued research emphasis. Of interest is that there was no similarity between the discriminating variables for Assistant and Associate Professors over the five year period. Variables for Full Professors showed only slight similarity to each of the other ranks.

The differences between faculty ranks within a given year were quite apparent. Over the five year period, the most common discriminating variables between ranks were: unscheduled teaching, academic advising, media development, faculty/department administration, department participation, college participation, professional service and institutional service.

In general, over the study period, the three faculty ranks can be characterized as follows:

1. Assistant Professors - Generally have highest levels in unscheduled teaching and academic advising, lowest levels in media development and faculty/department administration, moderate to high levels in department participation, lowest levels in college participation, and highest levels in professional service and moderate in institutional service.
2. Associate Professors - Generally have moderate to high levels in unscheduled teaching, moderate levels in academic advising, media development and faculty/department administration, moderate to high levels in department participation, high levels in college participation, lowest levels in professional service and moderate levels in institutional service.

3. Full Professors - Generally have lowest levels in unscheduled teaching and academic advising, moderate levels in media development, highest levels in faculty/department administration, lowest levels in department participation, and moderate levels in college participation, professional service and institutional service.

The intention is to continue to examine these differences later in more detail. Additional information will be added in the future to make the analysis more precise. Under consideration are the additions of tenure status, academic division and departmental FTE student production. These variables should provide the ability to establish a series of subgroups within each of the faculty ranks to discover more about their activity profiles. Another possibility is to examine groups of individuals before and after tenure approval or promotion to see how their activity profiles change after these professional changes.

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A FACULTY FLOW MODEL FOR ESTIMATING REALISTIC AFFIRMATIVE ACTION GOALS

by

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This paper addresses the problem of determining what proportion of the faculty a given affirmative group should be at various points in time. It contains a derivation and mathematical proof of an algorithm which expresses this proportion as a function of four quantities: the yearly attrition rate of all faculty, the proportion of new openings each year filled by the particular group, the maximum number of years faculty stay in the system, and, of course, the year of interest. For predicting the effects of changed policy the current proportion of the group is also incorporated in the expression. The algorithm is most useful when applied to a large faculty.

This relatively simple theoretical model seeks to unfold some of the complexities in predicting progress toward affirmative action targets. Complexities arise, of course, through faculty attrition, retirement, differential hiring rates and so forth. The model relates these quantities to provide more accurate predictions based on the logical relationship among these several inputs.

The terms of the model are as follows:

Let

P_y = proportion of the minority group on the faculty in year "y"

P_0 = proportion of the minority group on the faculty today - year 0.

a = proportion of faculty lost through attrition per year

r = proportion of faculty retiring per year

w = proportion of the minority group filling new openings each year. Also this is the desired endstate proportion

N = maximum possible number of years on faculty assuming a fixed retirement age. Also this is the number of years it would take to reach equilibrium ($P_y = w$) if there were no attrition.

y = year starting with 0 for current year, 1 for next year and so forth

Then the proportion of the minority group on the faculty in year "y" can be expressed as a function of the above quantities. Essentially, one establishes yearly minority faculty cohorts (i.e., faculty starting in 1979, faculty starting in 1980, and so forth) each of which has faced attrition for different lengths of time. The sum of these cohorts comprise the current minority faculty.

By summing over all cohorts up to year "y" one can determine the expected proportion a given minority group will be in year "y". The model can be expressed in the following equation:

$$P_y = \sum_{i = 1}^{y \leq N} w\,(a + r)(1 - a)^{i - 1} \qquad \text{(eq.1)}$$

The rationale for the model in equation 1 is as follows: We started out with no minorities. The term (a + r) is the proportion of faculty replaced each year because of attrition and retirement. The term w (a + r) is the proportion of minorities added to the faculty each year. The term $(1 - a)^{i - 1}$ individually adjusts each minority faculty cohort for attrition according to the number of years (i) the cohort has been here. Note there is no adjustment for retirement since minorities are assumed to enter the system as newcomers who won't retire for N years, and by then we will have attained equilibrium. It is perhaps easier to visualize the model as a series of two sets of cohorts moving through time.

		Year						
		0	1	2	...	y	...	N
Proportions:	Minority (Py)	0	$w(a+r)$	$w(a+r)(1-a)^1$	...	P_y	...	w
	Non-Minority (1-Py)	1	$1-w(a+r)$	1-(above)	...	$1-P_y$	...	$1-w$

Consider the following non-fictitious example: The attrition rate is 1.39% (a = .0139) and the maximum stay for faculty members is about 30 years (N = 30) and the retirement rate is r = .0266. If we assumed there is an insignificant or 0 proportion of women on the faculty today, what proportion of the faculty members would be female in three years if we started hiring equal proportions of men and women (w = .5).

$$P_3 = \sum_{i=1}^{3 \le 30} (.5)(.0139 + .0266)(.9861)^{i-1} \qquad \text{(eq. 2)}$$

$$= .02025 \sum_{i=1}^{3} (.9861)^{i-1} \qquad \text{(eq. 3)}$$

$$= .02025(.9861)^0 + .02025(.9861)^1 + .02025(.9861)^2 \qquad \text{(eq. 4)}$$

$$= .05991$$

In this example, the first term in equation 4 represents the proportion of new women faculty hired this year. The second term is the proportion hired last year adjusted for a year's worth of attrition, and the third term is the proportion hired the year before last adjusted for two years worth of attrition. (We've assumed attrition occurs at the end of each year.) Essentially the model compounds attrition for each cohort, and tells us who is left.

There is a closed form of this summation which can be derived.

Closed Form of the Model:

recall $$P_y = \sum_{i=1}^{y \leq N} w\ (a+r)\ (1-a)^{i-1} \qquad \text{(eq. 5)}$$

since w(a+r) doesn't depend on i equation 5 becomes for $y \leq N$:

$$P_y = w(a+r) \left[\sum_{i=1}^{y \leq N} (1-a)^{i-1} \right] \qquad \text{(eq. 6)}$$

the sum in brackets can be replaced by its closed form:

$$P_y = w(a+r) \left[\frac{1-(1-a)^y}{a} \right] \qquad \text{(eq. 7)}$$

Proof:

$$S = \sum_{i=1}^{y} (1-a)^{i-1} = \frac{1-(1-a)^y}{a} \qquad \text{(eq. 8)}$$

$$(1-a)\ S = \sum_{i=1}^{y} (1-a)(1-a)^{i-1} \qquad \text{(eq. 9)}$$

$$= \sum_{i=1}^{y} (1-a)^i \qquad \text{(eq. 10)}$$

Using Power Series Expansion:

$$S = (1-a)^0 + (1-a)^1 + (1-a^2) + \ldots (1-a)^{y-1} \qquad \text{(eq.11)}$$

$$(1-a)\ S = (1-a)^1 + (1-a)^2 + \ldots (1-a)^{y-1} + (1-a)^y \qquad \text{(eq.12)}$$

$$S - (1-a)\ S = (1-a)^0 - (1-a)^y \qquad \text{(eq. 13)}$$

$$S\ (1-1+a) = 1 - (1 - a)^y \qquad \text{(eq. 14)}$$

$$S = \frac{1 - (1-a)^y}{a} \qquad \text{(eq. 15)}$$

$$P_y = w\ (a + r) \left[\frac{1 - (1-a)^y}{a}\right] \qquad \text{(eq. 16)}$$

It turns out, as one might suspect, that the attrition rate and the retirement rate are not independent. After 30 years of cumulative attrition, a given cohort retires. Therefore we can express the retirement rate as the proportion of the "30 years in the system" cohort who survive to retirement age. Thus we can employ equation 1 to solve for the retirement rate:

$$r = (a + r)\ (1 - a)^N \qquad \text{(eq. 17)}$$

$$r - r\ (1-a)^N = a\ (1-a)^N \qquad \text{(eq. 18)}$$

$$r\ (1 - (1 - a)^N) = a\ (1 - a)^N \qquad \text{(eq. 19)}$$

$$r = \frac{a\ (1-a)^N}{1 - (1-a)^N} \qquad \text{(eq. 20)}$$

Substituting for r in our model (eq. 16) we find:

$$P_y = w\left(a + \frac{a\,(1-a)^N}{1-(1-a)^N}\right)\left(\frac{1-(1-a)^y}{a}\right) \qquad \text{(eq. 21)}$$

$$P_y = w\left(\frac{a(1-(1-a)^N) \;+ a\,(1-a)^N}{1-(1-a)^N}\right)\left(\frac{1-(1-a)^y}{a}\right) \qquad \text{(eq. 22)}$$

$$P_y = w\cancel{a}\left(\frac{1-\cancel{(1-a)}^N + \cancel{(1-a)}^N}{1-(1-a)^N}\right)\left(\frac{1-(1-a)^y}{\cancel{a}}\right) \qquad \text{(eq. 23)}$$

$$P_y = w\left(\frac{1-(1-a)^Y}{1-(1-a)^N}\right) \qquad \text{(eq. 24)}$$

Thus the proportion of women in years y can be expressed as a function of year(y), hiring rate (w), and maximum number of years in the system (N).

Suppose for the moment the initial proportion of women was not zero ($P_0 \neq 0$). A modification to the model can be developed which tracks the current proportion of women. The modification would have to decrement this initial proportion representing historical policy, at the same rate which it increments the proportion of new hires under the new policy. Since the rate is given by the term in parenthesis in equation 24 the initial non-zero proportion or cohort ages in the following manner:

$$P_y' = P_0\left(1 - \left(\frac{1-(1-a)^y}{1-(1-a)^N}\right)\right) \qquad \text{(eq. 25)}$$

The complete model thus becomes

$$P_y = P_0\left(1 - \frac{1-(1-a)^y}{1-(1-a)^N}\right) + w\left(\frac{1-(1-a)^y}{1-(1-a)^N}\right) \qquad \text{(eq. 26)}$$

or

$$P_y = P_0 + (w - P_0)\left(\frac{1-(1-a)^y}{1-(1-a)^N}\right) \qquad \text{(eq. 27)}$$

Thus we now have a model (eq. 27) which predicts affirmative action progress for any subgroup - males, females, and minorities alike. All one needs to know is the initial proportion of faculty the affirmative action group is, the attrition rate, and the maximum number of years faculty stay in the system.

One of the simplifying assumptions is that the attrition rate is constant over each age cohort. Clearly, this oversimplifies the plight of assistant professors who leave because of failing to achieve tenure. The model can be manipulated to handle the situation of assistant professors separately. In fact, it is probably better to divide the faculty into non-tenured and tenured groups and apply the model separately, but this is a topic for another paper.

SPS/vs

SKETCHES OF INSTITUTIONAL RESEARCH AT A COMMUNITY COLLEGE

Carl E. Feigenbaum

Brookdale Community College

1. Introduction. The key value to our thumbnail sketch panel discussion, talking about sharing ideas, problems, etc., is the perspective provided by variety--what we, in our various environments, job descriptions, lines of command, and budgets are doing in the wide-open area of I.R., and thus what we can share, relate to, discuss.

This understanding provided by perspective is a healthy thing. I.R. among the community colleges in New Jersey ranges from a $3 million 15-man AIDP staff project to a one-man shop simply buying into the State Educational Computer System. And I'm sure that similar variety exists here.

Speaking of perspective--I recently participated in a conference, sharing a discussion with Prairie View Community College. In preparing my talk, I concentrated on how we had established a pretty extensive assessment system, considering the available resources, listing a wide range of activities and generated reports. It was only when I met my fellow presenter at the conference that I found out that he was part of the Dallas County Community College District with a total enrollment of 45,000 and a research budget of millions. However, I found that our audience profited from both our discussions.

FOLLOW-UP SURVEY. The first study I'd like to discuss today was recently completed under a grant funded by the New Jersey Division of Vocational Education. This was a special follow-up study of our Vocational Program graduates (earning terminal A.A.S. degrees, designed for immediate job entry) who immediately upon graduation transferred to baccalaureate study at a four-year college.

For assessment and evaluation purposes, Brookdale collects and analyzes a variety of outcome measures. One part of this system (which I will discuss later) is an extensive survey system that collects outcomes measurements from its graduates. Nine months after graduation, each graduate is asked to provide measures of job/college status, satisfaction with his/her status, satisfaction with Brookdale's preparation, and satisfaction with personal growth made as a result of his/her BCC experience. These outcomes are collected, analyzed, and reported on, and then become part of the general evaluation process of our Educational Services.

However, when analyzing such outcomes measures for educational assessment, planning, and curricula development, there has been a rather definite dichotomy imposed between graduates of Transfer programs (A.A./A.S.) and graduates of career-oriented Vocational programs (A.A.S./Certificates). It is thought, State law dictates, and curricula are so constructed, that a Transfer degree program is to provide earnable credits that can be transferrable to a baccalaureate degree program, with little or minimum training in specific job skills, which is the province of the upper division college. A Vocational program, on the other hand, is to develop job skills and knowledge for entry into a chosen career, with inclusion of a minimum of General Education credits that are not necessarily transferrable to a four-year college.

It has been found, in our survey studies, that this dichotomy does not adequately describe the postgraduation activities of our graduates. In 1976, 44 (30.3%) of 145 Vocational program graduates who responded to the Nine Month Follow-Up indicated that they were currently enrolled in a four-year college. In 1977, 57 (25%) responded that they had enrolled in a baccalaureate program.

These outcomes on postgraduation status raised important questions about the basic assumptions of our evaluation system, our curricula objectives, and possibly our educational mission. Are we truly meeting the objectives of our Vocational graduates? Why are they continuing their education so soon after graduation from their "terminal" program? Are they returning to school because we did not prepare them adequately for job entry? Are they returning to school because the job market was closed off and they had to seek new career paths? Are they returning to school because they changed their job objectives and life style plans, even though they were adequately prepared for a job in an open field? Are the job molds for particular careers becoming so specialized/detailed that our training programs will have to be extended and enriched, to the level of baccalaureate degrees?

Will A.A.S. programs become lower-level transfer units of baccalaureate four-year Vocational programs? Will the continued transfer trends, aided by the apparently easy transfer of Vocational program credits, mean the gradual change in mission, content, and place of two-year Vocational programs?

The primary purpose of our study was to hold personal interviews with all BCC Vocational program graduates of AY 1977-78 who were locatable in New Jersey, asking them a series of questions:

- What were your original objectives in coming to study at BCC?
- What are your educational objectives now, at your current school?

- Why have you developed these objectives?
- How well did BCC meet your objectives for coming to Brookdale?

A second objective was to create a standing network, channel of communication, with the four-year colleges in New Jersey. We proposed to establish this channel with the schools to gain wider access to a larger number of graduates not locatable in our earlier survey effort.

Through introductory letters and phone calls, we explained to appropriate officials (Registrars, Directors of Admissions, Directors of Computer Center) of all four-year public and private colleges in New Jersey the nature, purpose, and scope of this project. We initially requested a listing of all BCC graduates who were currently enrolled at each school, by name, address, phone number, Social Security number, number of credits applied for transfer, and number of credits accepted for transfer. For a variety of reasons (confidentiality, unavailability) we whittled down our requests to name and address, but even then we received these basic data from only four of the 27 colleges solicited. (Five colleges reported no BCC graduates attending, so the total number of colleges involved was 32.) Though we were able to meet most reservations made against releasing such information, though we assured them that all labor burdens would be assumed by our project staff, and though we followed up two times by telephone, only four schools were able to provide the data requested.

Reasons for inability to comply with our requests runs as follows:

No BCC graduates attending	5
No response	5
Data not systemized for access	4
Data on information system but not currently accessible	5

Data on system and accessible but no personnel available	2
Restrictions due to concerns about confidentiality	7
Responding	4
	32

Just a note: a standing articulation system would be of great help to both levels--community college and four-year college. We have not had much success in New Jersey; one transfer study done by the State did not please the four-year colleges because it showed the transfer students from the community colleges doing better at the four-year colleges than the indigenous students.

In terms of assessment of BCC preparation, we found that 15 (50%) graduates came to earn an A.A.S. degree as a step to a B.A., that 11 (36.7%) came to get a degree for job entry. As a measure of met objectives, we examined the current objectives of study at four-year colleges: 4 (13.3%) are currently studying for entry into an allied career field; 16 (53.3%) for advancement in a current job field, 2 (6.7%) came for upgrading of job skills. Of the 8 (26.7%) who reported that they were studying for entry into a new career field, the given reasons were: no openings in current field (1), did not like current field (2), and greater opportunities in new field (3). There was not one instance of a grad listing poor BCC preparation or other program deficiency as reason for developing new educational objectives. We concluded that Brookdale did meet these peoples' educational objectives in terms of their intentions for coming to study at BCC.

In terms of new educational objectives, it appears that sizeable numbers of these Vocational program graduates had clearly anticipated baccalaureate study as a not-too-distant element of their educational plan. That those giving the objectives of Job Advancement, Skills Upgrading, and Earning a B.A. did enroll so soon after graduation suggests that they had study at four-year schools as fairly immediate steps. And as such, we can wonder why they studied for their A.A.S. degree, if not to obtain something that could tide them over in their employment until they did earn their Bachelor's degree.

Transfers of credit do not seem to be a problem. Data from this study substantiates the existence of the "reverse pyramid", in which four-year colleges are accepting for credit those skill courses that they are to be teaching as part of the upper division of the baccalaureate program and are teaching these graduates the general education courses that are the preserve of the lower division program.

Counseling services have to be improved, in terms of offering transfer and job market advice to prospective graduates of both Terminal and Transfer degree programs. To some extent, counselors will have to show their advisees that they are knowledgeable and concerned, as many graduates reported that they did not even consult them, valuing their instructors' advice instead.

DEGREE AUDIT SYSTEM. The second topic I'd like to discuss is our establishment of a Degree Program Audit System that will collect a wide number of outcomes measures--short-term, long-term, longer-term--on each of our programs. We are a sizeable community college--FTES of 2695 Fall term, headcount of 9761, 25 degree Programs, total college budget of $13,400,000. But the Office of Research, Evaluation, and Planning is a small outfit, with two professionals and one nonacademic research assistant. Second, our share of the total College budget is .3%. We do not have extensive interface with the College's computer center (and sometimes, we have no interface at all). And lastly, we are on a daily basis so busy that we don't have time to see the forest for the trees.

In nuts and bolts terms, we are essentially a production team that is responsible for generating certain production reports, evaluation surveys, and special assessment studies conducted along the time line of our academic calendar. As the Office of Research, we are accountable to the President, though most of our reports are for the Vice President for Educational Services, who heads a separate division. We need support services of computer services, print shop, mail room, Instructional Developmental Laboratory, Public Affairs, in order to get our job done; and thus we have to juggle resources and bide time, waiting to get all our components tied together.

In nuts and bolts terms, we collect as measures educational outcomes that result from our instructional/counseling/support/administrative services. But there is also a skeleton, a backbone to our flesh; and that is the educational philosophy of the school, the goals and mission. The bones give structure to our evaluation reports.

We are learner-centered, based on the belief that the student who enrolls today is coming to learn to the best of his/her abilities. He/she is not to be penalized for past performance or educational background. Corollaries are that the student should be able to learn at his/her own rate, in his/her own style, up to his/her best abilities.

As such, to accommodate these beliefs, we are multi-media in orientation, offering a variety of learning alternatives. In order not to punish for past performance or educational background, we have no punitive grading, no failing grades. For those not able to meet learning objectives in a term, we offer continuing grades--DCR--to give time needed to complete those objectives in the following term.

We are based on the mastery of learning, that successful learning is based on the meeting, by the student, of certain basic competency measures in each and any subject matter discipline. And, to evaluate this educational system, the various blocks of our system are:

- Opening Term Enrollment Report
- Faculty Load Report
- Achievement Report (academic achievement for past term, arrayed by important variables)
- Cumulative Achievement Report (academic achievement of student since term of entry)
- Grades Issued Analysis
- Deferred Credits Report
- Student Progress Regulation Report (academic probation report)
- Students Lacking Basic Entry Skills Report
- Degrees Awarded
- Retention Characteristics Report
- Nine-Month Graduate Follow-Up Survey
- Employers Survey
- Twenty-Eight Month Graduate Follow-Up Survey
- Continuation (Attrition) Survey
- Student Attitude Survey

- Follow-Up Study on Students Not Succeeding in Basic Skills Courses.

There are, however, as there always will be, bugs and limitations to our system. One general problem area is that of imposing a machinery on an idiosyncratic educational system full of quirks and catches. Another major problem area is that of basic system deficiencies.

We have no smooth articulation with Computer Services. It reports to a separate Division, with very little accountability to the general College and certainly not to us. One example is the receipt by Research of the SPSS software package with a "Here it is, we can't help you because we don't know anything about it and we are not going to try." So now I am the only SPSS authority on campus.

And finally, I have been here two years, I have just gotten the total system up, and I don't have a feel yet for how well our Evaluation and Assessment activities are institutionalized. I don't know yet what data are used, by whom, for what purposes, and when. This is the basic deficiency of the system, and fortunately or unfortunately, one to which I will get the answer pretty soon.

EVALUATION OF BASIC SKILLS PROGRAM. The third theme is Evaluating Developmental Skills Programs (Remedial Programs). What I would like to present here is a rough description of the various considerations/factors/variables that go into evaluating a Developmental Skills Program at the community college level. I'm going to outline not a formal research-evaluation design but rather a delineation of major variables/assumptions that shape our program and the resulting evaluations of its effectiveness.

Brookdale Community College is an open-door institution. As a comprehensive community college, we are open to all those who wish to seek college level education, regardless of their prior educational experiences or the length of time which has elapsed since last attending school. Consequently, students may come to BCC lacking basic skills normally learned in some other prior educational experience. And in order to offer such students the opportunity to succeed, we offer a program of Developmental Studies. As an open-door school, we have to help all our students make the most of their educational experience, for they are coming to BCC to learn and we don't want to penalize them now for prior educational accomplishment in the past.

In philosophical terms, I debate with myself whether the Basic Skills mission in the community college is different in degree or kind from the mission of the secondary school and liberal arts education of the four-year college. We are all playing catch-up, but as a community college we have a student body that comes on its own to learn, for its own purposes that vary from getting a degree to taking a course for skill upgrading to taking a course for personal development. And in developing an evaluation scheme, we have to ask "How are our students doing as a result of their Developmental Courses?" and possibly take into account the type of school population we have with their differing educational objectives. We have students who are educationally disadvantaged, economically disadvantaged, have a different language, are returning to school after a twenty-year absence, are poorly prepared in their prior educational experiences.

And how do we evaluate the effectiveness of the Developmental Skills Program that is set up to help them? For the past two years, we have been weighing various measures to be used, and these measures fall into three major areas of concern:

Is the purpose of our program to help the student achieve a basic functioning level in the skills of reading, writing, and math? If so, is evaluation a matter of having the faculty decide on minimum competency standards and then see how many students can meet these requirements and thus pass the course? Is the purpose of the Developmental Program to get students to meet course requirements of specific remedial courses and consider the effectiveness of such in terms of numbers passing and failing? What then is the standard--normative or competency-based? Does it matter how many terms it takes for individuals to meet basic requirements? Does it matter in what sequence, or with what corequisites, or with what other courses the student took with the remedial courses? We collect measures of how students meet course requirements on our courses. Thus, for Fall Term 1978, 687 people were enrolled in ENG 100, of whom 405 completed the course (59%), 18 took a deferred enrollment (3%), and 264 did not complete the course - fail (38%). In REA, 465 were enrolled, 257 completed (55%), 41 deferred (9%), and 167 did not complete (36%). In MTH, 515 were enrolled, 171 completed (33%), 88 deferred (17%), and 256 did not complete (50%).

Is the basic purpose of Developmental Courses to enable the student to succeed at his/her studies as a college student, rather than the more limited one of passing certain course requirements? Does the effectiveness of our program consist of the number of students, lacking basic skills upon entry, who persist in their college study? Does attendance in Development Skills reduce attrition, improve retention? There are a variety of reasons other than academic difficulties that affect persistence. The educationally disadvantaged are usually the economically disadvantaged, and this introduces external variables of financial, employment, transportation, and child care difficulties. How do we account for these?

We collect and report on persistence. For example, for students starting study in Spring Term 1978, 71 scored below cut-off in Writing. Of these 71, 43 (60.6%) enrolled in the Developmental Courses. Of these 43, 32 passed and of these 29 (90.6%) returned for further study. Of the 11 not passing, 5 (45.4%) returned and 6 did not. There were 28 not enrolled (39.4% of the 71 scoring below cut-off) and of these 15 (53.6%) returned while 46.4% did not.

If the purpose of Basic Skills courses is to help succeed in college study, then should success be expressed in terms of persistence or in terms of what and how much is actually learned? What is an acceptable level of performance, to indicate an effective basic skills program? Do we have to control for ability, for course load, course sequence, program major?

We are still working on our basic reporting-evaluation instrument for measuring the effectiveness of our Developmental Courses. We have a series of reporting components, of evaluation reports, and as our purpose is really to assure that our students are benefiting from our services (i.e., reporting rather than research), I envision a series of reports making up our system, with additional reports generated to meet new situations.

The Assessment of the Quality of Student Life

Robert F. Grose

Amherst College

INTRODUCTION

Earlier papers here and elsewhere have reported the development of a variety of techniques to assess selected aspects of student living. My current report is in the form of a set of progress notes which I would like to share with you, not as anything definitive but rather to indicate some of the attempts we have made and very possibly some bad habits that we are acquiring.

There does seem to be a contagious epidemic of questions spreading across the country and lodging most frequently in bodies of higher education. We are finding that we must fend off numerous inquiries about student "life" from all sides. For one reason or another, this past spring we ended up with three overlapping questionnaires for students in as many months. (I have even been honored by a pleasant parody student questionnaire concocted by our local humor group which they recently foisted on the student body.) The accompanying sample pages of questionnaires serve as both negative and positive examples. We reported earlier on the Cycles Surveys which follow many of the items developed by Daniel Kegan at Hampshire College. The Quality of Undergraduate Life Questionnaire overlaps with that but depends upon certain interests of a special committee at Amherst with interest in the progress of coeducation, in sexual discrimination, the nature of racial discrimination on the campus, satisfaction with housing for students, and questions of social life and fraternities. The third has been developed by Robert Pace at the Center for the Study of Higher Education at UCLA and was reported to some extent at the San Diego AIR meetings. (Full copies of the first two questionnaires may be obtained from the author; the College Student Experiences Scale is available from Dr. Pace at the Higher Education Research Institute.) For now I would like briefly to touch on the goals of such investigations, the bench mark problem, the use of open-ended questions, possible other measures, a word about methods of analysis and the question of comparisons.

GOALS AND PURPOSES

Why should we be concerned with the morale, satisfaction, or "quality of life" of our students? These appear to be a set of intervening variables. What complicates matters is that certain qualities of student life may be looked upon predominately as the input side in which we are asked to study the effects of certain aspects of student life upon other variables, academic performance for example. Secondly, we find that the qualities of student life are looked upon as moderator or environmental variables, perhaps even process variables, that modulate the major planned learning experiences. (At least as hoped for by college Catalog language.) Finally, the quality of student life can appear as output or as our dependent variable when we are interested in certain programs that affect the improvement of conditions and responses of our students.

In recent years, higher education institutions have shown a greater concern about students' lives in order to provide what is needed to bring them to the campus and to keep them on the campus, sufficently pleased to continue their studies (and thus, we hope, their learning). It may not be for the most altruistic reasons we are concerned; we need students to survive. Students, particularly in the Sixties, have made known to us their own concerns for the ways in which they live.

But what will our information about the qualities of student life provide for decision makers? I find several:

A. The development of the applicant as a consumer has brought with it more probing questions about what "it really is like" to be at a particular college or university, living as well as studying. The buyer, our student, wants to know more about the characteristics of "the commodity" for which he or someone is going to pay, both in time and money.

B. The tremendous increase in interest in the evaluation of the quality of programs of institutions brings with it both concern and demand for sophisticated knowledge, as well as broadened accountability.

C. Very probably a major reason is the matter of "retention management," not only for recruiting students, but also for maintaining them on the campus. We are beginning to emphasize the nature of the student's existence on the campus as it might relate to attrition.

D. There is of course the general curiosity of students, faculty, and administrators to say nothing of alumni about "what is really happening," and the needs to dispel rumors are frequent. Moreover, when information is published about one campus, a number of queries arrive as to how that same set of characteristics can best be described on our own campus. The media act as many of the multipliers.

E. One very useful function, too, is that of the anticipatory reference point. Information on the characteristics of the quality of student life can serve as bench marks for future comparisons and evaluation. By having repeated measures on morale or on particular aspects of satisfaction and opinion, the later impact of social events, of new administrative policies, of a changed student body, or of innovative curriculum changes can better be gauged in reference to initial levels. (Daniel Kegan called these measures "soundings" and I rather like that metaphor as the college craft moves in and out of the shallows, reefs, and deep water.)

BENCH MARKS OF OTHER KINDS

In examining the quality of undergraduate life in its many facets, and in asking questions of students as to their satisfaction and intensity of feeling, we often must do without anchoring points. Comparative institutional research is valuable for these purposes.

What really might be our expectations for how many students are going to be satisfied at a particular time. What results might we get if we asked the general public or students in secondary school, or those in another country how "satisfied" they were, or what is the "quality" of their lives. Just what kind of place would we have if everyone were completely satisfied? What would be the tensions for growth and creativity?

Moreover, what are the likely maxima and minima that would be acceptable or could be expected? Variability itself also forms one of the significant features of the pool of judgments of a group of students. When Amherst students describe their College environment on the Pace Scales, there is fairly great agreement on the degree of emphasis on academic and intellectual qualities, but as for aesthetic, expressive and creative aspects, there is much wider dispersion to be found. We may even find an occasional rectangular or "U" shaped distribution in some data; there is no reason at all to expect the magic normal distribution. One sometimes feels rewarded that one has finally chosen some salient questions when one can produce rather jagged or multimodal distributions of student response.

OPEN-ENDED QUESTIONS

We are only beginning to find ways to deal with a) the important affective responses of students and b) their communicating those feelings to us. We all have used open-ended questions in various ways. One of my favorites has been one also suggested by Daniel Kegan. It follows the tradition of sentence completion tests or other projective techniques. I have shared some of these already with some of you but just to give the flavor, here are some responses in the Cycles Survey this past spring. Selected student responses would be as follows:

"About Amherst, I feel: Ambivalent. Granted such an ideal and euphoric a situation, why do I feel as bored and unsatisfied as I do?"

"Tired. At this point in the semester the year seems too long. One must work hard. An overachiever surrounded by overachievers must work especially hard. But a self-respect and pride comes with the tiredness."

"Positively. Achievement of a 50/50 male/female ratio soon is important. We also could use 1 or 2 fast half-backs."

By judicious screening, one can produce rather different impressions. I have used content analysis to get at both the tone and the content, but this is not always satisfactory. Yet the answers do have a flavor or immediacy to them that can be very helpful. With time, one can get a pretty good sense of the different features that are salient and can attempt in future questionnaires to incorporate factors, characteristics, or events that were mentioned frequently.

VARIETIES OF MEASURES

As studies of the college experience continue, we should be developing a breadth of techniques for expressing different features of undergraduate college life. The examples here cited all come from questionnaire materials, and we must keep in mind some cautions. We generally do not have independent evidence the students actually know some of the items requested or can recall them accurately. Even if they do know, we cannot be certain that they would wish to reveal them frankly to us for the study in question. The auspices under which questionnaires are sent may determine in good measure not only the kind of responses, but also even the kinds of individuals choosing to take the time to answer the questions. For example, at Amherst a committee on _the quality of undergraduate life_ may produce some bias in responses to it no matter what sampling is attempted.

It should be recognized that these and other questionnaires in the past have often attempted to discern what is _wrong_, _uncomfortable_, or _unpleasant_ about the student's life. Such questions may elicit exaggeration since if an investigator asks over and over again where something is troubling one, the usual respondent will attempt to accommodate and to find something wrong to please the inquirer, even though much of his/her life may in general be quite satisfactory. (I finally rebelled and asked students: "During this semester, what do you feel you have done to _improve_ the quality of life at Amherst?")

You have heard from other reports how successful continuing longitudinal panel interviews can be. Witness the excellent work at SUNY

Buffalo. I have seen less examination of student newspapers,or the use of student diaries, or the development of observers such as faculty or parents. One most useful procedure that we have used is students' best estimates of how they spend their time. Pace has used this approach in his material, you will notice, at least in terms of the frequency with which something occurs.

METHODS OF ANALYSES

We found that the Statistical Package for the Social Sciences has considerable merit in allowing the quick appraisal of frequencies and percentages with the fairly flexible further examination by cross tabulation of any variable by any other to yield simple chi squares as well as the very useful tables of frequencies and percentages.

A large chart showing by asterisks any significant chi squares for each question by the cross tabulated variables turned out to be very helpful for us. That is, if we did a cross tabulation by class (freshman, sophomore, junior, senior) we simply noted by one, two, or three asterisks increasing degrees of statistical significance and placed them in the column against the appropriate question. By doing this with a number of crosscutting variables, we were able to discover some interesting patterns and some leads for further data examination.

Factor analyses and other procedures for discriminant analysis could be useful in reducing the facets of student reaction to fewer dimensions. Techniques to highlight possible interactions can also help us as well as what is becoming known as exploratory data analysis and analysis of qualitative data (AQD).

Perhaps, though, the journalist, the poet, the essayist will help us more than the computer digitator. Human patterns, or even vignettes, can communicate more of many experiences than columns of figures. Even a tape recording of students giving their own views and suggestions might be powerful.

COMPARISONS

It is difficult to interpret how a group of students responds to some aspect of their environment in quantitative terms. One way is to examine the degree of satisfaction with a particular feature of the students' environment in comparison to the satisfaction with other features present at the same time. That is, one can look at the relative profile of discomforts and satisfaction at a point in time. For example, the material from 1979 Cycles indicates that there is a considerable difference in satisfaction with the Amherst Security Program as against that with the food and food service. Some 92% were satisfied with the Security Program, at least to some extent, whereas a comparable figure for food and food service is only 48%. Either figure by itself would carry less information.

Another set of comparisons is found by comparing our students with those at other institutions. Such things as the Pace Scales, the Institutional Goals Inventory, or the American Council on Education Incoming Freshman Inventory are useful in supplying those comparative data. An example here is again the Cycles Survey and the studies thoughtfully summarized for the Five Colleges by Larry Benedict and Daniel Blythe of the University of Massachusetts, Amherst. For example, satisfaction with a particular support service such as Health Services is generally very high except at one institution. Standard items in questionnaires have a way of creeping in so that we can calibrate across different groups and across different campuses.

Perhaps as useful as any other kind of comparison is the longitudinal use of the same questions from time to time. Again, this was introduced by Daniel Kegan at Hampshire College who used several common questions each semester at Hampshire College.

Yet a fourth sort of comparison comes from asking the same or similar questions to different samples in different questionnaires at about the same time. We have done this as a result of the particular circumstances of last spring and found ourselves with three sets of data asked of different student samples in March, in April, and in May successively.

One concern of the campus was the number contemplating transfer: Was it going up? Were more women leaving than men? We do not always have the sense to make sure we ask things in just the same way. In the quality of undergraduate life questionnaire, the question was phrased; "Have you seriously considered transferring to another college within the last year?" 30% said they had. On the other hand, when one asked the same question substituting "during this semester" to a different sample a little later, the Cycles Survey group indicated only some 15% so responding. For the previous four years the percentage assenting to this question whether they had seriously considered transferring was also between 13% and 17% during the semester in question.

CONCLUDING REMARKS

What are the useful dimensions of college student life? We do not yet know. We are just beginning to discover what are the salient features of the lives of college students that are related to their growth and development.

Nor are things as tidy and nicely worked out as our graduate school course in survey techniques or psychological tests would have us attain. The overlapping, partially incomplete, fragmentary, and sometimes conflicting shards of evidence are what the institutional research worker must deal with again and again.

It is time-consuming, challenging, and often intriguing to attempt to piece together these various fragments and to try to communicate to decision-makers as fairly and as clearly as possible the import of our pieces of data for policy decisions. We have to continue to find ways, too, of uncovering our own biases and checking them when we can. We can try to admit them in our reports whenever we can, and I hope we will continue on our way as probing detectives, confident that even partial knowledge does have a place in the scheme of things and still hoping that better decisions will be made when ignorance can be reduced even a little.

QUALITY OF STUDENT LIFE QUESTIONNAIRE - SPRING 1979 - AMHERST COLLEGE

Sample Page (page 2 of 4-page questionnaire)

41. What factors do you want most in living facilities? ________________

___42. In this semester, how many hours a week on the average do you spend in class? (Write number of hours)

___43. In this semester, how many hours a week on the average do you spend studying? (Write number of hours)

___44. In this semester, how many hours a week on the average do you work in a paid job? (Write number of hours)

On the average, how many times per week do you go to the Gym:___45. Snack Bar:___46. Fayerweather Lounge:___47. Frost Library:___48. Fraternity House: (i.e. if not a resident therein)___49. *Smith:___50. *Mount Holyoke:___51. *Hampshire:___52. *U. Mass.:___53. Other places outside the Valley:___54. *Excluding travel for classes.

___55. In which dining room do you eat most frequently? 3) Garden; 4) West; 5) East; 6) Annex; 7) Vegetarian/Kosher dining room; 8) other or off-campus. (Write number)

___56. To what extent do you eat with the same group? (Use extent scale)

___57. How many "casual" friends do you now have? 1) one to five; 2) six to ten; 3) eleven to fifteen; 4) more than fifteen; 5) none. (Write number for category)

___58. How many people do you consider to be your close (as opposed to casual) friends? 1) one to five; 2) six to ten; 3) eleven to fifteen; 4) more than fifteen; 5) none. (Write number for category)

What percent of your close friends are: (Write percent for each category) of the same sex: ___59.; of the same class (e.g. 1980, 1981):___60.; of a different socio-economic background:___61.; of a different racial/ethnic background:___62.; of a different religion:___63.

___64. Do you have a boyfriend or girlfriend? 1) yes; 2) no.

___65. If yes, is he/she living 1) at Amherst? 2) at one of the other Five Colleges? 3) not on one of the campuses but within 25 miles? 4) beyond 25 but closer than 100 miles? 5) beyond 100 miles away? (Write number)

___66. How satisfied are you with the progress of coeducation at Amherst? 1) very dissatisfied; 2) dissatisfied; 3) satisfied; 4) very satisfied. (Write number)

___67. To what extent is there sex discrimination at Amherst? (Use extent scale)

How many courses have you taken at Amherst that have been taught by women faculty?___68. By men faculty?___69.

How many Five College interchange courses have you taken that have been taught by women faculty?___70. By men faculty?___71.

72. What problems do you perceive women students experience that are different from those of men students at Amherst? ________________

73. What problems do you perceive men students experience that are different from those of women students at Amherst? ________________

Please circle for each item the number of the category that best describes the composition of groups with whom you usually participate:

		with men only	mostly men, a few women	mixed equally	mostly women, a few men	with women only	it varies	alone
74.	eating meals	1	2	3	4	5	6	7
75.	partying	1	2	3	4	5	6	7
76.	going to a movie, concert, play	1	2	3	4	5	6	7
77.	watching sports events	1	2	3	4	5	6	7
78.	participating in extracurricular activ.	1	2	3	4	5	6	7
79.	engaging in bull sessions	1	2	3	4	5	6	7
80.	studying	1	2	3	4	5	6	7

___81. To what extent do you speak up in class? (Use extent scale)

___82. Have you personally witnessed any instances of sex discrimination at Amherst this year? 1) yes; 2) no. (If yes, would you describe briefly? ________________

83. What do you think will most help to complete the College's transition to a coeducational college? ________________

84. How would you characterize the current social life at Amherst College? ________________

CYCLES SURVEY
Amherst, Hampshire, Mount
Holyoke, Smith Colleges
University of Mass.

SAMPLE PAGE
(Page 1 of 2-page questionnaire)

April, 1979

AMHERST COLLEGE

We are trying to learn more about what living at Amherst is like and what types of changes occur over a period of time. We need your help in answering the following questions which focus on your experiences within the past two weeks, and in some cases, throughout the spring semester. Please complete this survey today and return it to OIR, Box 123, via College mail. Thank you for your assistance! (Your prompt response will save us the task of a follow-up mailing.)

Robert F. Grose
Office of Institutional Research

For questions 1-18 please use this SATISFACTION SCALE for your response:

1) very dissatisfied 2) dissatisfied 3) satisfied 4) very satisfied

____1. During the past two weeks, how satisfied have you been with your Amherst experience?

____2. During the past two weeks, how satisfied have you been with your academic experience?

____3. How satisfied have you been with your academic advisor this semester?

____4. How satisfied have you been with your academic progress in the past two weeks?

____5. How satisfied have you been with your social experience during the past two weeks?

____6. How satisfied have you been with your housing experience during the past two weeks?

____7. How satisfied have you been with the physical aspects of your present dormitory/house/residence during the past two weeks?

____8. How satisfied have you been with the attitudes and behavior of the other people in your dormitory/house/residence during the past two weeks?

____9. How satisfied are you with the progress of coeducation at Amherst?

____10. How satisfied are you with fraternities at Amherst?

____11. How satisfied have you been with security on the campus?

____12. How satisfied have you been with career guidance and counseling at Amherst?

____13. How satisfied have you been with personal counseling services at Amherst?

____14. How satisfied are you with the Amherst College Health Services?

____15. How satisfied have you been with the Registrar's/Records office?

____16. How satisfied have you been with the library resources and services at Amherst?

____17. How satisfied are you with the food and food service at Amherst College?

____18. How satisfied have you been with the athletic facilities and opportunities?

For questions 19-51 please use this EXTENT SCALE for your response:

0) not relevant or did not participate	3) to some extent
1) to a very little extent	4) to a great extent
2) to a little extent	5) to a very great extent

NOTE: Please respond to the following questions in context of the PAST TWO WEEKS.

____19. I feel I have influence over the things that happen to me at Amherst.

____20. I like myself.

____21. I have been able to participate in and create fun while completing my necessary work.

____22. I have usually been energetic and enthusiastic.

____23. I have been trusting of people.

____24. I have felt lonely.

____25. I have felt isolated from most of the people at Amherst.

____26. I have liked the people I live with the past two weeks.

____27. I have a commitment to an organized group, e.g. orchestra, athletic team, Amherst Student, club. What group?____________________

____28. To what extent are you satisfied with your average Amherst course (neither your best nor worst course)?

During the past two weeks, to what extent have you been involved in the following activities?

____29. Intellectual ____30. Social ____31. Physical

During the past two weeks, to what extent have you learned in each of these three areas?

____32. Intellectual ____33. Social ____34. Physical

____35. To what extent do you prepare your course assignments prior to each class?

____36. To what extent have you encountered sex discrimination at Amherst?

____37. To what extent have you encountered racial discrimination at Amherst?

____38. During this semester, to what extent do you feel faculty members have been responsive to student needs?

____39. During this semester, to what extent do you feel that Student Government has been responsive to student needs?

____40. During this semester, to what extent do you feel that administrators have been responsive to student needs?

Sample from "College Student Experiences Scale" Copyrighted by C. Robert Pace
(Page 5 of 8-page questionnaire)

DIRECTIONS: In your experience at this college during the current school year, about how often have you done each of the following? Indicate your response by filling in one of the spaces to the left of each statement.

Very often	Often	Occasionally	Never	Clubs and Organizations
○	○	○	○	Looked in the student newspaper for notices about campus events and student organizations.
○	○	○	○	Attended a program or event put on by a student group.
○	○	○	○	Read or asked about a club, organization, or student government activity.
○	○	○	○	Attended a meeting of a club, organization, or student government group.
○	○	○	○	Voted in a student election.
○	○	○	○	Discussed policies and issues related to campus activities and student government.
○	○	○	○	Worked in some student organization or special project (publications, student government, social event, etc.).
○	○	○	○	Discussed reasons for the success or lack of success of student club meetings, activities, or events.
○	○	○	○	Worked on a committee.
○	○	○	○	Met with a faculty adviser or administrator to discuss the activities of a student organization.

Very often	Often	Occasionally	Never	Experience in Writing
○	○	○	○	Used a dictionary or thesaurus to look up the proper meaning of words.
○	○	○	○	Consciously and systematically thought about grammar, sentence structure, paragraphs, word choice, and sequence of ideas or points as you were writing.
○	○	○	○	Wrote a rough draft of a paper or essay and then revised it yourself before handing it in.
○	○	○	○	Spent at least five hours or more writing a paper (not counting time spent in reading or at the library).
○	○	○	○	Asked other people to read something you wrote to see if it was clear to them.
○	○	○	○	Referred to a book or manual about style of writing, grammar, etc.
○	○	○	○	Revised a paper or composition two or more times before you were satisfied with it.
○	○	○	○	Asked an instructor for advice and help to improve your writing.

DIRECTIONS: In your experience at this college during the current school year, about how often have you done each of the following? Indicate your response by filling in one of the spaces to the left of each statement.

Very often	Often	Occasionally	Never	Personal Experiences
○	○	○	○	Told a friend why you reacted to another person the way you did.
○	○	○	○	Discussed with other students why some groups get along smoothly, and other groups don't.
○	○	○	○	Sought out a friend to help you with a personal problem.
○	○	○	○	Elected a course that dealt with understanding personal and social behavior.
○	○	○	○	Identified with a character in a book or movie and wondered what you might have done under similar circumstances.
○	○	○	○	Read articles or books about personal adjustment and personality development.
○	○	○	○	Taken a test to measure your abilities, interests, or attitudes.
○	○	○	○	Asked a friend to tell you what he/she really thought about you.
○	○	○	○	Been in a group where each person, including yourself, talked about his/her personal problems.
○	○	○	○	Talked with a counselor or other specialist about problems of a personal nature.

Very often	Often	Occasionally	Never	Student Acquaintances
○	○	○	○	Made friends with students whose academic major field was very different from yours.
○	○	○	○	Made friends with students whose interests were very different from yours.
○	○	○	○	Made friends with students whose family background (economic and social) was very different from yours.
○	○	○	○	Made friends with students whose age was very different from yours.
○	○	○	○	Made friends with students whose race was different from yours.
○	○	○	○	Made friends with students from another country.
○	○	○	○	Had serious discussions with students whose philosophy of life or personal values were very different from yours.
○	○	○	○	Had serious discussions with students whose religious beliefs were very different from yours.
○	○	○	○	Had serious discussions with students whose political opinions were very different from yours.

Grade Inflation: A Review of the Literature

Wendell G. Lorang
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Evaluation of student performance (grading) has long been a matter of concern in American higher education. "The first grading in America was descriptive, with comments on the character of the student placed alongside comments on the student's intellectual worthiness" (Mayville, 1975, p.6). With the introduction of new fields of study and the growth of the elective system, notions of acceptable performance or achievement were bound to vary and variety of grading formats resulted. Numeric, alphabetic, Pass/Fail and Plus/Minus grading were experimented with throughout the 1800s as faculty attempted to deal with their own discontent with methods of grading (Smallwood, 1935). Notice that it was the faculty who initiated change. Students, in the view of one historian of American higher education, "more or less accepted the subjective character of the opinions expressed concerning their intellectual ability" (Smallwood, 1935, preface).

In our own time, during the 1950s and early 1960s, concern was expressed over the stability of grades as the aptitude of the college entrant pool increased. "(F)aculties taken as a whole apparently awarded about the same grades year to year whether their students were brighter or duller than last year's student" (Baird and Feister, 1972).

In the mid-1970s, articles began to appear expressing concern over increases in the number of A's and B's awarded and in rising grade point averages. These concerns gained the public's attention through reports carried in the popular news media. Sharp percentage increases in grades awarded were cited for such well-known and prestigious institutions as Harvard, Stanford, Dartmouth and Yale. Explanations, when given, often amounted to accusations of cynicism, disaffection and leniency on the part of faculty. The source of the alarm appears to be the belief that higher grades were either unearned or undeserved and that the historic role of grades and, indeed, of higher education, to "sift and sort" students for graduate school and careers was jeopardized. Coming on the heels of the turbulent days of anti-war activism, this concern served to focus critical attention on academic standards and the role of higher education in today's society.

Unfortunately, the assumptions underlying the charge of grade inflation and supportable explanations for grade changes are rarely discussed. This easy acceptance of unchallenged assumption provides a useful framework for categorizing the available literature. One portion of this literature, including numerous news media articles (though more general education journals are not exempt), focuses on identifying the existence of grade inflation. A second major group of articles attempts to understand or explain why the awarding of A's and B's has apparently increased.

In the first category, the mere existence of an increase in grades or grade-point averages over time is sufficient to merit the loaded phrase "grade inflation." This judgement is made without reference to changes in grading systems, student composition, aptitude, fields of study or prior preparation, much less the statistical reliability of the changes. For these authors, the social or educational significance of these findings is limited to deploring the leniency of faculty grading practices and a concern that higher education is forfeiting its role as the differentiator of student ability -- the sifter and sorter of America's youth. Most interestingly, it has never been suggested, according to one reviewer, that faculty may be doing a better job of teaching or that students are learning more. The view that an increase in grades reflects a decline in academic standards and not an increase in the effectiveness of the teaching enterprise betrays curious attitudes of the population towards higher education. Besides suggesting that higher education may be held in less esteem than one might hope, it may also indicate a predominant view of higher education's role in society as that of a credentialling/certifying agent of students and not as a motivator and developer of intellectual interests and skills.

Most reports and journal articles on grade inflation focus on single institutions. One researcher, however, has been credited with documenting grade inflation as a national phenomenon. Based on responses from 134 institutions (28% of the number contacted) Juola (1974, p.2) concluded that "These data certainly verify that grade inflation in higher education is truly occurring and that it is a national trend." He arrived at this conclusion, however, without addressing the representativeness of the sample, determining the statistical significance of the grade point average changes he found or recognizing, much less controlling for, differences in grade point average calculations over time and between institutions.

Suslow (1977) also has concluded from a survey of the leading 50 federally funded research universities (about half of whom provided usable information) that this trend is a national one. Despite their respective deficiencies, these studies have nevertheless influenced perceptions of grade inflation as a national trend.

Another disturbing aspect of this body of "identifying" literature is the tendency to suggest unsupported explanations for the apparent increase in grades. The comment of one author typifies much of the literature -- "Many of the reasons suggested in this article are unmeasurable and general to the point of speculation, but I believe they are nonetheless valid" (Davidson, 1975, p. 122).

Birnbaum (1977) offers an excellent summary of these explanations, suggesting the following groups:

> Major social conditions affecting society in general and higher education in particular (e.g., student activism related to Vietnam, the civil rights movement, new management styles)
>
> Changes in student behavior (e.g., better selected, better prepared, harder working)
>
> Changes in faculty behavior (e.g., reluctance to evaluate; more benign grading practices; and sensivity to effects on faculty evaluations, students' future success, and department enrollments)
>
> Changes in grading policies (e.g., different grading options, like Pass/Fail; exclusion of some grades from grade point average calculations; varying withdrawal policies; policies which facilitate students' avoiding lower grades)
>
> Changes in curriculum (e.g., reduction or elimination of required courses, the introduction of non-traditional instructional methodologies, new majors)
>
> Changes in student demography (e.g., increases in the number of minority enrollments, changes in the distribution of students by sex and major).

These changes, as noted above, are often cited but rarely investigated. The one exception for studies in the first category (those concerned with identifying rather than understanding the phenomenon) is changes in student behavior Some studies (e.g., Chester, no date; University of Utah, 1976;

Carney, et. al., 1978; Jacobs, Johnson and Keene, 1978) have compared changes in grades with changes in student aptitude. Finding that student aptitude, as measured by some combination of high school grades and national admissions examinations, has declined while college grades have risen strengthens their conclusion that grade inflation exists. This chain of reasoning has several flaws, however. First, the reasons behind the decline in national test scores are not understood. Moreover, these tests admittedly measure only quantitative and verbal aptitude and not diligence, creativeness, motivation, conformity and other traits which may influence college success. Indeed, test scores and high school grades rarely account for more than 25 - 35% of the variance in actual college grades (Astin, 1977). Thus, not only is the decline in national test score average not understood, neither is there reliable evidence that the national average of grades has risen. At any particular institution, grades may well have gone up (even significantly) while test score averages for entering freshmen may have also risen. But even if this were not the case, the relationship between grades and test scores is tenuous enough to caution against a hasty conclusion.

Of the studies falling into the second category -- those that attempt to explain rising grades -- those conducted at Georgia State University, the University of Wisconsin, Oshkosh and Kansas State University are among the best.

At Georgia State University, research has been conducted for several years on the question of increasing grades and factors underlying these increases. Prather and Smith (1976) found "a tendency for the proportion of higher grades to decrease as class size increased" (p.360), that "(p)art-time teachers, instructors and graduate teaching assistants (GTAS) tended to give higher grades" (p.358), and that "(c)ourses emphasizing quantitative and factual learning tend to have asssigned lower grades. The higher grades are found in career-oriented courses, such as teacher training" (p.358). In another Georgia State study, Prather, Smith and Kodias (1979) found that

> "The grade point average at this University has followed the national trend in higher education and has been increasing for a number of years, while aptitude scores of the student population have been decreasing. During this time it has also evidenced substantial changes in program enrollment and curricula. Grades in 144 individual courses ... exhibited small evidence of systematic inflation, indicating that it is the course mix that has changed and not generally the standard of grading within individual courses over time. The course grades varied widely by discipline" (p.22). (Emphasis added.)

The authors define "systematic inflation" as an "increase in average grades received by students in a particular course, after taking into account the students' major fields and background" (p.14). Such shifting program enrollments and curricular changes have also been documented by the Carnegie Council in a national study of undergraduate education (Blackburn, et. al., 1976).

Different conclusions were reached in a study conducted at The University of Wisconsin, Oshkosh (Birnbaum, 1977). Six hypotheses were tested to see if they accounted for an observed increase in the grade point average from 1968 to 1974: Five were found not to effect the awarding of grades -- "Data from one institution therefore indicates that university grade point averages are rising because similar students are getting higher grades in the same courses with the same level of achievement, and not because of unusual selectivity or achievement, demographic changes in the student body, or curriculum alterations" (Birnbaum, 1977, p.535). The sixth hypothesis -- that changes in grading policies have an effect -- was only slightly supported.

Finally, researchers at Kansas State University have reported finding that three other factors contribute to an increase in grades. Carney et. al. (1978) concluded that student evaluations of faculty for the purpose of salary, promotion and tenure; criterion-referenced testing (measuring "student mastering of specific course objectives and results in grades being assigned to what a student achieves and not according to how he ranks in class" (p.219)); and the increase in experience-oriented courses are factors which may influence the increase in grades. Data from this study, as well as a survey soliciting faculty opinion, did not support the contention that increased use of withdrawals and incompletes contributed to grade inflation.

A different conclusion was reportedly reached in a University of Utah study (Wagstaff, no date). There it was decided that grade inflation from 1965 to 1974 at the lower division was caused primarily by withdrawals.

A different approach to research on college grading is the use of adaption-level theory. Based on several published findings, Goldman and Widawski (1976) state that "It seems clear that different grading standards exist for different departments within the same university. Some of these differences are quite substantial ... (these) grading standards do not differ capriciously among different fields. Instead, those fields with the 'best qualified' students (i.e., highest high school GPA and SAT scores) have the most stringent grading standards .... Apparently the assessment of human performance is rarely absolute -- people are judged in comparison to their peers. If their peers are very highly qualified, then judgment is rigorous" (p.389).

These observations provide further insight into the Georgia State University studies mentioned above. In those studies it was observed that while no systematic inflation of grades in individual courses over time was evident, wide differences did exist among courses in different disciplines. These differences, emphasized by shifting program enrollments, appeared to contribute to an increase in the grade point average at Georgia State. The adaption-level research, by confirming the existence of different grading standards across disciplines, assists in further understanding the factors underlying increasing grades.

CONCLUSIONS

Except in the 1978 Georgia State University study of 144 courses in which no systematic grade inflation was found, the majority of studies -- whether simplistic or sophisticated -- indicate that grades or grade point averages are increasing. Explanations that have been investigated are not uniformly supported by the research, however. Indeed, the conclusions of two of the better institutional studies (Georgia State and Wisconsin, at Oshkosh) are contradictory. Nevertheless, the research raises enough questions and presents findings, albeit tentative and at times contradictory, to warrant reflection before charging ahead with proposals to change grading systems or raise grade-point average standards for the conferral of honors. "(W)hether grade inflation constitutes a problem and what, if any, remedial action should be undertaken depend very much on its causes" (Bromley, et. al., 1978, p.695).

It is clear that the causes go beyond what is implied by the term "inflation" and by the popular perception of laxity on the part of the faculty. Indeed, according to one author, "the mere awarding of higher grades does not imply grade inflation if the comparisons are between students of different ability levels, working at different performance levels, and taking different courses" (Birnbaum, 1977, p.522).

In order to deal with this issue, it is important to consider the degree to which our current concern is conditioned by our assumptions about the role of grades. An understanding of the assumptions makes clearer why, for so many, an increase in grades is grade inflation. Should grades serve as a means of sifting and sorting students? Should grading be on an absolute or relative scale? Should grades measure achievement/learning or rank in class? Should grades motivate as well as measure performance? Are all of these objectives compatible? Can one achieve consistency in the actual evaluation process assuming agreement on evaluation goals?

Such a line of inquiry is fruitless, however, without the recognition that grades are an arbitrary but required product of the dynamic interaction between faculty and students in the context of programs of study. One hopes that it is the interaction and not the grades which are important, but our perception of higher education's role continues to obscure this fact.

A better understanding of this interaction is germane not only as it bears on our immediate topic but also for its broader inplications for higher education. For example, although there is no direct supporting evidence, many researchers believe that students are aware of different grading systems across majors and that these differences influence students, particularly those with "low ability," in their choice of majors. "Differential grading standards may therefore attract low ability students to easy grading fields which, in turn, may lower the adaption-level induced standards of the instructors in those fields" (Goldman and Hewitt, 1975, p.160). Furthermore, if admission standards are lowered in an attempt to maintain enrollments, this research would suggest that because of "low ability", a majority of these students would major in the humanities and social sciences which have less stringent grading standards (Goldman et. al.,1974). This movement of students between areas of study can have a significant impact upon institutions with enrollment-driven faculty allocation processes.

In conclusion, institutional researchers owe it to themselves and to their institutions to understand this process and caution against hasty "reforms" which, though politically satisfying, may serve only to obscure fundamental issues of grading policy, admissions, standards, curriculum changes and student course-taking patterns.

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Designing A Town Specific Economic Impact Study

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Economic impact studies attempt to analyze the effect of the presence of an educational institution on the local economy. This paper provides some suggestions for approaching such a study; the authors recently completed an economic impact study at the University of Massachusetts/ Amherst.

Overview of the Process

The first question that should be asked is, Why should there be an economic impact study? Since performing a study requires expenditures of both time and money, the goals of the study should be clear. The authors wished to obtain accurate data on retail sales, jobs and income attributable to the university.

Economic impact studies have been performed in a variety of ways. Two helpful references are Caffrey and Isaacs (1971) and Salley (1977). Although ideas from other impact studies can be used as sub-components in the study design, the overall approach should reflect the idiosyncrasies of the local situation. The simpler and more understandable the design, the more likely that the results of the study will be acceptable, both in the local and the university community. Since the scope of the study will be limited by financial constraints, the main emphasis should reflect the goals.

Caffrey and Isaacs (1971) suggest appointing a citizen advisory committee to assist in the study. The citizen advisory committee for the Amherst study was a very helpful sounding board during the initial design, the questionnaire testing, and the analysis. The members of the committee represented town government, the business community, and the university community.

The study findings will be more understandable if the institution's impact can be described as a proportion of total activity in the area. A highly respected source of data on total retail sales is Sales and Marketing Management, (1979). Updated retail sales data are published annually in July.

Careful thought should be given to the question of disseminating the results and conclusions of the study. Methods used at the University of Massachusetts included a technical report, a news release, and an easy to read summary brochure. Copies of the technical report and the brochure are available from the authors.

Study Performed at the University of Massachusetts/Amherst

The University of Massachusetts/Amherst has an enrollment of almost 25,000 students and is located in the Pioneer Valley of Western Massachusetts. The nearest large city is Springfield, Massachusetts, which is about twenty-five miles distance. The largest impact area was set equal to The Pioneer Valley. The localized impact area was defined as the eight towns in the immediate vicinity of the University; over 75 percent of the University's employees lived in the eight towns. Three of these towns are major shopping areas while all eight towns are residential. Since retail sales were a major focus of the study, the study was designed to identify retail sales for each of the three shopping towns as well as the eight-town area and the Pioneer Valley.

A survey was designed to collect accurate retail expenditure data and was distributed to a random sample of faculty, staff and students. The design of the survey was a very critical part of the study. The citizen advisory committee was used as a pretest group; their comments were very valuable and led to a number of modifications. OPSCAN answer sheets were used to simplify the data conversion problem. A copy of the survey is included as Attachment I. There are two major design flaws in the survey. First, varying numbers of columns were required for different questions. This was an attempt to obtain very accurate information on weekly or monthly expenditures; see questions 21 to 36. We would have improved our accuracy and lowered the number of errors encountered by maintaining single column answers with ranges. That is, 0 to \$50, \$50 to \$100, and so forth. Secondly, when asking individuals how much they have spent for various items, the time frame logically varies from weekly to yearly. Obviously, it would be difficult to standardize anything to the same period; that is, to have everything in terms of, say monthly expenditures. But one can group all the weekly items together, monthly items together and yearly items together.

The total contributed to the local economy was calculated by first determining average expenditures for students and employees of the University. These average expenditures were multiplied by the percent spent in each impact area as reported in the survey. In this way, the average amount expended in each impact area was obtained for resident and non-resident faculty, staff, and students. This average expenditure per individual was multiplied by the number of individuals as listed in university records to obtain the total impact.

Results

Results are available in a separate report. (Rumpf, 1979).

Cost of Performing Study

The total cost of performing this study was approximately $6,000. This included about $5,000 in personnel cost and approximately $1,000 in materials and computer usage.

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IMPACT OF THE UNIVERSITY OF MASSACHUSETTS AT AMHERST ON THE LOCAL ECONOMY

DIRECTIONS:

To assist us in the data analysis, we are using a computerized answer sheet. To record your anwers, completely blacken the correct responses on the answer sheet in the column(s) corresponding to each question. PLEASE USE A #2 PENCIL. Be careful to erase stray pencil marks and incorrect answers.

EXAMPLE:

1. Sex:

1 = Male
2 = Female

⓪ ① ● ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

If you are female, blacken the number 2 in the column for Question 1 on the answer sheet. Mark your response as shown to the left.

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1. Sex:

1 = Male
2 = Female

2. Age:

0 = Under 17
1 = 17 - 19
2 = 20 - 21
3 = 22 - 25
4 = 26 - 30
5 = 31 - 35
6 = 36 - 40
7 = 41 - 50
8 = 51 - 60
9 = Over 60

3. Relation to the University (choose only one--your main position; e.g., if you are a graduate student and are working part-time, you should mark "graduate student"):

1 = Stockbridge Student
2 = Undergraduate Student
3 = Graduate Student
4 = Faculty
5 = Professional
6 = Classified, Clerical
7 = Classified, Technical
8 = Classified, Other

4. If you are a student or an employee, as reported in Question 3, are you full- or part-time?

0 = Not Applicable
1 = Full-time student
2 = Part-time student
3 = Full-time employee
4 = Part-time employee, 20 - 30 hours per week
5 = Part-time employee, 10 - 20 hours per week
6 = Part-time employee, less than 10 hours

5. Marital Status:

1 = Single (never married)
2 = Divorced or separated
3 = Married
4 = Widowed

6. Number of preschool children living in your household:

0 = None
1 = One
2 = Two
3 = Three
4 = Four
5 = Five
6 = Six
7 = Seven
8 = Eight or more

7. Number of elementary through high school age children living in your household:

0 = None
1 = One
2 = Two
3 = Three
4 = Four
5 = Five
6 = Six
7 = Seven
8 = Eight or more

8. If you are a FACULTY member, what is your rank?

0 = Not Applicable
1 = Professor
2 = Associate Professor
3 = Assistant Professor
4 = Instructor
5 = Lecturer
6 = Other

9. If you hold a PROFESSIONAL or CLASSIFIED position, what is your rank?

0 = Not Applicable
1 = Staff Administrator
2 = Staff Associate
3 = Staff Assistant
4 = Grades 1 - 5
5 = Grades 6 - 10
6 = Grades 11 - 15
7 = Grades 16 and up
8 = Other

NON-STUDENTS GO TO QUESTION 14

10. If you are a STUDENT, are you employed?

0 = Not Applicable (go to Question 14)
1 = No
2 = Part-time, on campus
3 = Part-time, off campus
4 = Full-time, on campus
5 = Full-time, off campus
6 = Other

11. Student Residence Status:

1 = In-state
2 = Regional Student Program
3 = Out-of-state, United States
4 = Foreign

12. Approximately how much money did your parents contribute to your living expenses (include tuition and fees if paid by your parents) this year?

0 = Not Applicable or None
1 = Under $500
2 = $500 - $999
3 = $1,000 - $1,499
4 = $1,500 - $1,999
5 = $2,000 - $2,499
6 = $2,500 - $2,999
7 = $3,000 - $3,999
8 = $4,000 or more

13. How much financial assistance did you receive in the form of scholarships, fellowships, loans, tuition and/or fee waivers, this year?

0 = None
1 = Under $500
2 = $500 - $999
3 = $1,000 - $1,499
4 = $1,500 - $1,999
5 = $2,000 - $2,499
6 = $2,500 - $2,999
7 = $3,000 - $3,999
8 = $4,000 or more

ALL RESPONDENTS

14. Your annual salary:

0 = Under $2,500
1 = $2,500 - $4,999
2 = $5,000 - $7,499
3 = $7,500 - $9,999
4 = $10,000 - $14,999
5 = $15,000 - $22,499
6 = $22,500 - $29,999
7 = $30,000 - $39,999
8 = $40,000 or more

15. Spouse's Occupation:

0 = Not Applicable
1 = Spouse works at UMass
2 = Spouse works elsewhere
3 = Spouse is UMass student
4 = Spouse is student elsewhere
5 = Spouse is not employed

16. Spouse's annual salary:

0 = Under $2,500
1 = $2,500 - $4,999
2 = $5,000 - $7,499
3 = $7,500 - $9,999
4 = $10,000 - $14,999
5 = $15,000 - $22,499
6 = $22,500 - $29,999
7 = $30,000 - $39,999
8 = $40,000 or more

17. All other sources of funds (consulting, summer income, interest, dividends, etc.), this year.

0 = None
1 = Under $500
2 = $500 - $999
3 = $1,000 - $1,999
4 = $2,000 - $2,999
5 = $3,000 - $3,999
6 = $4,000 - $5,999
7 = $6,000 - $9,999
8 = $10,000 or more

18. Type of housing in which you live:

1 = Live on campus
2 = Fraternity or sorority
3 = Rent an apartment
4 = Rent a house
5 = Own a condominium
6 = Own a house
7 = Live with parents or other relative
8 = Other

19. Town in which you live:

1 = Amherst
2 = Hadley
3 = Northampton

4 = Belchertown, Leverett, Pelham, Shutesbury, Sunderland

5 = Deerfield, Greenfield, Hatfield, Montague, Turners Falls

6 = Chicopee, Easthampton, Granby, Ludlow, Palmer, South Hadley

7 = Other Hampden, Hampshire, and Franklin County towns

8 = Other

20. Would you be living in the greater Amherst area if it were not for the University (that is, if the University did not exist)?

1 = Yes
2 = Probably
3 = Probably not
4 = No

In this section you are requested to indicate actual dollar amounts spent, by blackening appropriate dollar numbers in columns of ones, tens, hundreds, and thousands. If the exact amount is not known, please estimate carefully.

EXAMPLE:

21. Rent or mortgage, per month:

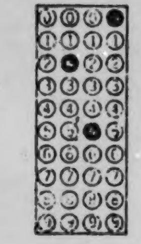
If your rent equals $250, then mark as shown in the columns below-right.

The first column represents thousands, the second hundreds, and so on.

If "Not Applicable," mark:

0 0 0 0

Note: If your rent is shared, enter only the amount that you provide.



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21. Rent or Mortgage for your own home, per month:

22. Local property taxes on own home (annually):

23. Utilities (natural gas, electricity, and telephone), per month:

24. Heating oil, per year:

25. Water and sewer payments, per year:

26. Refuse collection, per year:

27. How many cars (and other vehicles) do you own? (Use rightmost column only.)

28. Vehicle excise tax, per year:

29. Transportation (gas, repairs, bus fare), per month:

30. Health care, not including insurance, per year:

31. Insurance (vehicle, home, health, apartment, etc.) purchased through local agents, per year:

32. Groceries, household expenses, per week:

33. Restaurants and entertainmnet (movies, athletic events, etc.), per week:

34. Clothing, per month:

35. Furniture and appliances, per year:

36. Car payments (total of installments and/or lump sum payments for new or used cars), this year:

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37 - 41

Of your retail purchases (such as groceries, clothing, transportation and restaurants), what percentage of your money do you spend in the following areas (note that the Zayre/Stop & Shop area, as well as the malls, are in Hadley)?

37. In Amherst:

0 = None
1 = Under 10%
2 = 10% - 25%
3 = 25% - 40%
4 = 40% - 60%
5 = 60% - 75%
6 = 75% - 90%
7 = Over 90%

38. In Hadley:

0 = None
1 = Under 10%
2 = 10% - 25%
3 = 25% - 40%
4 = 40% - 60%
5 = 60% - 75%
6 = 75% - 90%
7 = Over 90%

39. In Northampton:

0 = None
1 = Under 10%
2 = 10% - 25%
3 = 25% - 40%
4 = 40% - 60%
5 = 60% - 75%
6 = 75% - 90%
7 = Over 90%

40. In other Pioneer Valley towns:

0 = None
1 = Under 10%
2 = 10% - 25%
3 = 25% - 40%
4 = 40% - 60%
5 = 60% - 75%
6 = 75% - 90%
7 = Over 90%

41. In other areas outside the Pioneer Valley:

0 = None
1 = Under 10%
2 = 10% - 25%
3 = 25% - 40%
4 = 40% - 60%
5 = 60% - 75%
6 = 75% - 90%
7 = Over 90%

---

42 - 46

Of your high expense purchases (furniture, appliances, automobiles) what percentage of your money do you spend in the following areas?

42. In Amherst:

0 = None
1 = Under 10%
2 = 10% - 25%
3 = 25% - 40%
4 = 40% - 60%
5 = 60% - 75%
6 = 75% - 90%
7 = Over 90%

43. In Hadley (use rightmost column only):

0 = None
1 = Under 10%
2 = 10% - 25%
3 = 25% - 40%
4 = 40% - 60%
5 = 60% - 75%
6 = 75% - 90%
7 = Over 90%

44. In Northampton (use rightmost column only):

0 = None
1 = Under 10%
2 = 10% - 25%
3 = 25% - 40%
4 = 40% - 60%
5 = 60% - 75%
6 = 75% - 90%
7 = Over 90%

45. In other Pioneer Valley towns (use rightmost column only):

0 = None
1 = Under 10%
2 = 10% - 25%
3 = 25% - 40%
4 = 40% - 60%
5 = 60% - 75%
6 = 75% - 90%
7 = Over 90%

46. In other areas out side the Pioneer Valley (use rightmost column only):

0 = None
1 = Under 10%
2 = 10% - 25%
3 = 25% - 40%
4 = 40% - 60%
5 = 60% - 75%
6 = 75% - 90%
7 = Over 90%

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47. How often do you have out-of-town quests (use rightmost column only)?

0 = Never
1 = 1 - 2 times per year
2 = 3 - 4 times per year
3 = 5 - 6 times per year
4 = 7 - 8 times per year
5 = Once a month
6 = More than once a month

48. On an average, how long do your out-of-town guests stay (use rightmost column only)?

0 = Not Applicable
1 = Less than a day
2 = Overnight
3 = Weekends (or 2-3 days)
4 = 4-5 days
5 = A week
6 = More than a week
7 = More than a month

HIGHER EDUCATION - CONSUMER MOVEMENT: PAST, PRESENT, AND FUTURE

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It is currently in vogue for college and university administrators to view students as consumers of higher education. This model of student-university relations has been fostered by federal and state government action, as well as internal operating practices of colleges and universities throughout the country. An example of this acceptance can even be seen in the NEAIR's call for papers which suggests, among other topics of interest, "Aiding the student as consumer". And yet, to date, no one has examined how far this movement has developed when compared to the widespread consumer movement in society. It is, therefore, the purpose of this paper to assess the development of the student consumer model by comparing it to the general notion of consumerism. The methodology of the study will be, first, to present a short history of both the consumer movement and the educational-consumer movement. Next, the current status of the student consumer movement will be briefly reviewed with references to Federal and State legislation and judicial action. Finally, the paper will compare the existent state of the art of the consumer movement with developing trends in educational-consumer rights.

The notion that the student is a consumer of education is a relatively recent development when compared to the general consumerism movement. Dr. Harvey W. Willie, Chief Chemist for the U. S. Department of Agriculture, is generally credited with being the founder of consumerism. As a result of his crusade against chemically adulterated food, Congress passed the first major federal consumer legislation in the form of the Pure Food and Drug Act of 1906. The consumer movement received its next major impetus when President John F. Kennedy delivered his Special Message on Protecting the Consumer Interest on March 15, 1962 in which he presented to Congress a consumer Bill of Rights. These rights included:

(1) The right to safety -- to be protected against the marketing of goods which are hazardous to health or life.
(2) The right to be informed -- to be protected against fraudulent, deceitful, or grossly misleading information, advertising, labeling, or other practices, and to be given the facts he needs to make an informed choice.
(3) The right to choose -- to be assured, wherever possible, access to a variety of products and services at competitive prices; and in those industries in which competition is not workable and Government regulation is substituted, an assurance of satisfactory quality and service at fair prices.
(4) The right to be heard -- to be assured that consumer interests will receive full and sympathetic consideration in the formulation of Government policy, and fair and expeditious treatment in its administrative tribunals (Kennedy, 1962).

The trend toward consumer protection in this country can be traced back to 1965 when Ralph Nader wrote Unsafe at Any Speed. The book however, was not well received by the American public until the New York Times reported that General Motors had undertaken an investigation of Ralph Nader. The publicity resulted in instant success for the book, catapulting Ralph Nader into the national spotlight and consumerism into the nation's households.

Consideration of the student as an educational consumer is attributable to 1972, when the Federal Interagency Committee on Education created a subcommittee on consumer protection to study the major problems and issues confronting the student as a consumer or purchaser of educational service. In 1973, the subcommittee listed 25 educational consumer abuses and concerns including (1) degree mills; (2) discriminating refund policies; (3) misrepresentation in selling, advertising, promotional materials, etc.

In March 1974, the Educational Commission of the States, HEW's Federal Interagency Committee on Education, as well as other Federal agencies, sponsored the First National Conference on Consumer Protection and Education Beyond the High School. Among the concerns of the conference were: (1) misleading and inaccurate advertising; (2) indiscriminate and overly aggressive recruiting; (3) lack of full disclosure of salient institutional characteristics useful to the consumer, such as its history, financial policies, academic standards, and other relevant information (Willett, 1975).

In November 1974, the second National Conference on Consumer Protection and Postsecondary Education was held. The reports and recommendations from the conference covered four main areas: student rights, student responsibilities, institutional rights, and institutional responsibilities.

In December 1974, the Subcommittee on Educational Consumer Protection of the Federal Interagency Committee on Education issued its report, "Towards a Federal Strategy for Protection of the Consumer of Education". The report presents, as its overall principle, the fact that "The student is the primary consumer of educational services. As a result of educational inexperience, and a result of the expensive and intangible nature of the service he is purchasing, and in light of the potential for consumer abuse, and 'future service contracts' used by most schools, the educational consumer not only has responsibilities, but he has important consumer rights" (Subcommittee on Educational Consumer Protection, 1974).

In April 1975, President Gerald Ford sent a message to each department and agency in the executive branch of government requesting that they analyze their entire decision-making processes in order to determine how additional consumer involvement could make federal agencies more responsive to the needs of the American consumer. Replying to President Ford's directive, the Office of Education issued their first consumer protection regulations in the form of new requirements included in the Guaranteed Student Loan Program.

Prior to 1975, as we have seen, the federal effort had been, essentially, to use position papers and national conferences in an effort to cajole institutions of higher education into respecting the rights of students as consumers. It could even be said that these conferences served as an early warning signal by which various federal and state agencies were telling colleges and universities that, unless they cleaned up their act, the federal government would be forced to step in and do it for them. The regulations of the Guaranteed Student Loan Program of 1975 represent the beginning of the federal government regulatory role of college and universities in the area of consumer protection. It is these regulations which were expanded and broadened to become the "consumer information" requirements, part of the Educational Amendments of 1976.

The student consumer information regulations require that each institution provide to prospective and enrolled students, upon request, information about Federal and State financial aid, institutional costs and academic programs. Also, except where enrollment precludes it, the institution must provide a full time employee to help students obtain this information. The U. S. Office of Education, upon determining that a college or university has substantially misrepresented its programs, has the right to terminate or suspend the institution from participating in federal student financial assistance programs.

A number of states took their lead from the Federal government and enacted their own laws. The New York Act, for example, required that the Commissioner of Education formulate rules and regulations defining and interpreting the Federal law with greater specificity including providing, where available, information on job placement and graduate school placement statistics to interested students and prospective students.

While increasing numbers of students are turning to Federal and State Courts to enforce their rights, and while legal challenges of institutional practices are on the rise, the Courts have generally not been receptive to student/consumer complaints. The Courts have traditionally been reluctant to impose their wisdom on those whom they believe to be better qualified to make academic judgments, except when these judgments are motivated by arbitrariness, capriciousness, or bad faith. The Cases which have been brought are generally based on the premise that the college catalog constitutes a contract between the student and the institution. Where the institution has failed to deliver as promised in the catalog or other literature, the student has sought judicial redress, including tuition refund and/or damages. In one of the most famous cases, a student at the University of Bridgeport claimed that the required course she had taken was "worthless" -- that she did not learn anything, except how to use an overhead projector. Although all students in the course received an "A", she filed suit for $150.00 in tuition plus the cost for books and legal fees. The Vice President for Academic

Affairs suggested that, in return for her money, she should give back the three hours of credit and the "A" grade. The Court subsequently dismissed the student's suit.

In 1975, six medical students at George Washington University filed suit claiming the University was guilty of breach of contract because the catalog provided that tuition would be raised by no more than $200.00 annually. In 1975, George Washington University increased their tuition by $1,800 to $5,000 a year. The students were unsuccessful in their action.

Perhaps the most unusual case may have been a suit filed against Columbia University in 1959, in which a student alleged "that the university had failed to imbue him with 'wisdom, truth, character, enlightenment, understanding, justice, liberty, honesty, courage, beauty, and similar virtues and qualities', which he said were promised in various university documents, speeches by university officials and inscriptions on campus buildings" (Chronicle, November 24, 1975).

However, access to the Courts for the educational consumer does not parallel that which exists for the regular consumer. If a consumer buys a defective product, he can go to Small Claims Court, pay a fee, which is usually no more than five dollars, and is able, without legal representation, to have his day in court. However, at least in New York State, public colleges and universities, are, in fact, extensions of the state itself and, as such, can only be sued in the Court of Claims. This is often a complicated, time-consuming process usually necessitating use of legal counsel and risk of substantial expense to the individual.

In relating President Kennedy's Consumer Bill of Rights to the student consumer, one finds that the most progress has been made in the area of the right to be informed. We have already discussed the federal effort in this area. With the passage of the Student Consumer Information Act, the students are now being supplied with information on the policies and programs of the institution to which they are applying or attending. It is the hope that, with this information, the students will be in a better position to make an informed choice of the institution they want to attend, as well as to know their rights relative to that institution. Also, as I mentioned, a number of states have seen the value of having an informed student education consumer and have acted to expand the federal regulations with their own. One area where the states have taken the initiative and an area which is of major significance to institutional researchers is the recent legislative action relating to standardized tests. The first state to take the initiative to pass a disclosure law opening this area to consumer scrutiny was California. The legislation required that by November 1979, certain information concerning student tests must be filed with the California Postsecondary Educational Commission. Among the information to be opened up to public scrutiny were copies of tests no longer in use, along with the correct answers, and data on the reliability and validity of tests currently in use (National On-Campus Report, November 1978).

The New York "Truth in Testing" Bill, which is scheduled to go into effect on January 1, 1980, significantly expands the scope of information which must be made available to the consumer. The Standardized Testing Law applies to all tests given in New York State including, but not limited to, tests typically used as criteria for admission into undergraduate, graduate, and professional school programs. Each testing agency is required to file with the Commissioner of Education within thirty days after the results of a standardized test are issued, a copy of all test questions, correct answers, and the rules for transferring raw scores into reported scores, and an explanation of the rules. In addition, a subject may, within ninety days of the release of the test score, request a copy of the test questions, a copy of his answer sheet, a copy of the correct answers, an indication of what questions he answered correctly, and a statement of the raw score used to calculate the scores sent to the subject. The only tests excluded from complying with this section of the law are the College Board Achievement test, the GRE Advancement Test, and tests an institution develops for its own use. In addition, each testing agency must provide the prospective test taker, along with the registration form, information about the test such as its purpose, how it is to be used, subject matter to be tested, and how the test results will be interpreted and reported.

Finally, the regulation prohibits the release of the test score unless specifically authorized by the subject. However, the test agency may release all previous scores received by the subject on a test to anyone designated by him/her to receive the current score. A violation of any section of the Article constitutes a civil penalty with the sanction not to exceed five hundred dollars for each violation.

Prior to the passage of the Bill, a number of testing agencies lobbied heavily against it. To date, the reaction has included a strong statement by various testing agencies of the difficulty of complying with the law, as well as how it will significantly increase the costs of the tests. In addition, the Association of American Medical Colleges and the American Dental Association decided to express their displeasure by boycotting the giving of their examinations in New York State. It will be interesting to see if the law is amended before the January 1, 1980 date, or whether the various testing agencies find it within their ability to comply with the Act. In addition, the American Council on Education estimates that at least twenty more states will be considering similar proposals during the next year. More significant, however, is the recent interest at the federal level of enacting such a law, and thereby taking pressure off the individual states. Presently, the Elementary, Secondary, and Vocational Education Subcommittee of the House Education and Labor Committee is considering two bills relating to testing, H. R. 4949, and H.R. 3564. Of the two bills, H.R. 4949 more closely approximates the New York State Law by expanding on the national level the disclosure obligations in the New York State Law.

In testimony before the subcommittee, the sponsor of H.R. 3564, Representative Sam M. Gibbons (D-Fla), said "No one would buy a car or a house without adequate information, but thousands of students and others must take tests each year that may influence their entire future although they are denied information about the test itself..." (College and University Reports, August 6, 1979). H.R. 3564, called the "Truth in Testing Act of 1979", attempts to address what is perceived as an over-emphasis on test results in selection decisions, by limiting the emphasis that can be placed upon them.

Having discussed the historical evolution of the consumer movement, the student consumer movement, and current developments within the movement, I will now explore future trends in student consumerism. One method of assessing the future potential of the student consumer movement is to look at the current rights of the consumer in society and examine the effect of applying them to student consumerism. One of the most dramatic developments in consumerism is the notion of recall. The principle of recall assumes that manufacturers are responsible for producing products free of defects. Where defects are identified, the manufacturer may be required to arrange for the return of its product so that the defect may be corrected. This concept has application to higher education, as exemplified in the following case: A student in a medical school is taught a certain procedure by his faculty member. Two years after the student graduates, the faculty member learns that the procedure he was teaching was incorrect, and has been superseded by a far superior procedure. The faculty member then notifies the student of the error and requests him to come back for a one-day refresher course on the new procedure. We approximate this today in licensure programs which have a continuing education component. As continuing education becomes the rule rather than the exception for all professions, it will become the vehicle by which revised or correct information replaces defective information.

While the notion of recall makes sense in reference to professional education, its application to other areas of higher education may be more problematic. It is difficult to conceive of a case in which a faculty member presents a student in ethics with a misinterpretation of Plato's Symposium, and, at a later date, must contact the student with the purpose of giving him the correct interpretation.

Product liability represents another major development in the consumer movement. The courts have acknowledged a producer's liability for his products. When these products are defective, and the defect is causally connected to the pain and suffering of individuals, the manufacturer cannot escape culpability. This shift in responsibility has led to the suggestion that the maxim caveat emptor (let the buyer beware) should be changed to caveat venditor (let the seller beware). Although the concept of product liability does not presently have an application in higher education, it is not difficult to conceive of how this notion could be extended to higher education. Let us consider the example used in the discussion of recall. A medical student is taught a certain procedure by a faculty member which the faculty member discovers at a subsequent date to be incorrect. Instead, this time he does nothing about it. Two years later the student, now a practicing physician, uses the procedure and kills his patient. Presently, the Courts have held that the physician may be sued for malpractice; however, that is the extent of the chain. It would not be difficult, however, to add another link to the chain whereby either the patient's family or the physician could sue the faculty member and school on the grounds that they are liable for providing a defective product. We have, in fact, seen a similar situation in the elementary schools in which parents have brought suit against school boards where their children have graduated from eighth grade but cannot read or write at the fourth grade level. Is this not a form of product liability?

As we have already seen, the most substantial gains in the student consumer movement have occurred in the area which the general consumer movement terms "disclosure". Disclosure laws require the producer to provide accurate information to the consumer to enable him/her to make an intelligent choice as to whether to enter into the agreement or purchase the product offered. We are all familiar with examples of these types of "truth-in" laws, such as the truth-in lending law and the Federal Trade Commission Legislation requiring the listing of the ingredients in a product on its label. Again, the purpose of these laws is to provide the consumer with information to facilitate making an informed choice.

As we discussed earlier, the bulk of the Federal and State government's efforts in the area of student consumerism has been designed to provide the students with more information to aid them in the decision to attend the institution, as well as what their rights are once they are in attendance. However, the Student Consumer Information Act, as well as the states' regulations supplementing this act, are quite limited in scope. It can be said that they stop at the classroom door. These laws make no effort to provide the student with information he or she needs to make intelligent decisions about academic matters. Consequently, if we are to look at future movement in this area, it is likely to be in this area. Departments may come to be expected to publish informative and accurate course descriptions for each course they offer. The course description will probably include the name of the instructor, the text used, the basis for grading in the course (exams or papers), method for final evaluation in the course, a description of the material the course will cover, and description of the prerequisite(s) of the course. This information will place a student in a better position to decide if he or she wants to take the course. Some of you may comment that this will place an unreasonable burden on the faculty and administration. I would respond by asking you if this is really much different from requiring that the ingredients on a package be listed on the label.

Higher education received numerous warnings that, unless it assumed self-regulatory responsibility for remedying the educational abuses and concerns, it was only a matter of time until the federal government stepped in and assumed such a role. In 1975, we saw the beginning of federal intervention when Congress enacted the student consumer information requirements. A number of states quickly followed suit by enacting their own requirements for information that must be provided to the student and prospective student. Redress of abuses through the Courts has been much slower in part due to the Court's reluctance to impose their wisdom on those whom they believe are better qualified. However, the number of student consumer cases that are being brought is on the rise, and it is only a matter of time until they receive greater receptivity in the Courts.

Finally, when compared to the general consumer movement, there are numerous areas into which the student consumer movement has not yet expanded. Some, naturally are beyond the scope of the educational consumer; for others, however, it may very well be only a matter of time before we find even more of our discretion limited by laws regulating the amount of information that we must provide the educational consumer and the academician being held more accountable for the information he imparts.

If there is a conclusion to be made, it is that higher education has become an industry, and like any other industry, it must be regulated in order to protect the consumers of its products.

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A Developmental Model for College Attrition

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Much of the research on College Attrition as reviewed in Astin (1975), Pantages and Creedon (1978), and Tinto (1975) points to the need of an explicit consideration of a developmental model as a theoretical basis of attrition. In the developmental model, the student is more than the sum of his parts (i.e., aptitudes, achievements, interests, values, and personality). That is, the student develops in an environment as a whole. Furthermore, the rates of development when viewed in terms of cognitive and affective aspects of the individual (i.e., his cognitive domain and affective domain) differ over the individuals as well as over the sex of the individuals (e.g., the cognitive areas of Quantitative and Verbal). If the rates at which an individual develops in the cognitive and affective domains and in turn his levels of achievements in these domains are significantly lower than those required to "fit" (Goslin, 1969 and Rootman, 1972) in the institutional environment (i.e., the social and academic environment as stated in Tinto, 1975), the individual's chances of persisting or even surviving are small. Also if the rates at which an individual develops in the cognitive and affective domains are significantly higher than those required to "fit" in the institutional environment, the individual's chances of persisting are still small. Thus, the attrition of an individual in a particular institution (or environment) is dependent on the rate of development of the individual and the extent to which the institution can absorb or integrate (Tinto, 1975) the individual and his developmental differences. This paper presents substantive evidence for the need of a developmental model in college attrition and then delineates a specific model.

Substantive Evidence

The broadest support of the developmental model for college attrition is based on the purpose of higher education in America. An original purpose of higher education in America was reported as "personal development through acculturation to the classics and to moral principles" (Carnegie Commission on Higher Education, 1974). Presently, this purpose of higher education in America is "personal development in the education of an individual student and the provision of an environment for developmental growth" (Carnegie Commission on Higher Education, 1974). Consequently, to the extent that the student's development (or rate of development) differs from that implicitly or explicitly prescribed by the institution of higher education, the student becomes an attrition case.

The other supportive evidence falls in the category of phenomenological evidence. This evidence occurs in the form of theoretical models, types of analyses, and specific phenomenological differences occurring over the years at college. Besides demonstrating the occurrence of the anticipated developmental changes (i.e., cognitive and affective changes), the data indicates the extent of these changes.

At the most complex level of data representation (i.e., the model level), Tinto's integration and interaction model (Tinto, 1975), Spady's group withdrawal model (Spady, 1970), and Rootman's "fit" model (Rootman, 1972) may all be interpreted in terms of a basic developmental structure. An individual student enters an unknown environment (i.e., the academic and social environment of the university) and through a developmental process (or processes) must be integrated (absorbed) in the unknown environment. The failure to develop in such a way as to effect integration results in a failure to "fit" in the environment and a subsequent increase in the withdrawal from the environment. These models fail to explicitly consider this developmental process and in turn the rate of student development in the new (unknown) environment.

Specifically, Tinto's model is an institutionally oriented model. This model emphasizes the integration and interaction of the student in the institution. That is, the student is both academically and socially integrated in the institution. Essentially, Tinto's model is a sociological as contrasted to learning model. Learning is more than an interaction with an environment. Learning, at its very least, is an accumulation of the effects of such interactions.

Rootman's model is a person oriented model. This model emphasizes person-role "fit" and interpersonal "fit". Person-role "fit" is the degree of fit between the individual and his role. Interpersonal "fit" is the degree of fit between the individual and his cohort. However, such interpersonal relationships and the person's perceived or actual role can be viewed as components in or results of a developmental process.

Spady's model is also a "fit" model. This model emphasizes the degree of fit between the individual and his socializing environment. The individual's increasing failure to "fit" in the socializing environment leads to total group withdrawal. This increasing failure to "fit" may be viewed as an outcome of an on-going process.

The next lowest level of data representation is the analysis level. The analysis level is a simpler model level than that given above in that these models are limited to certain quantitative representations. Such models are the stepwise regression analysis model, the stepwise discriminant analysis model, longitudinal models, path analysis models, and conditional probability models. These models are represented in the analyses reported in Astin (1975), Pantages and Creedon (1978), and Tinto (1975). All of these analyses emphasize relationships between earlier independent variables (i.e., cognitive and affective variables) with a later occurring dependent variable of persisting or not persisting in the given university environment. The regression and discriminant models are only very simple longitudinal models. Currently (Pantages and Creedon, 1978), a need exists for even more detailed longitudinal models that address the individual student's development in the study of the attrition-retention problem. For the same reason, path analysis, with its more detailed description of the individual student's development, has also become important in the study of the attrition-retention problem. The key phrase is individual student development.

Finally, the most basic level of substantive support of a developmental model is the data or phenomenological level. Essentially, this level is the basic determinant of the preceding levels; the models must represent the data or the phenomenon. These data show differences in the rate of development at the time the students encounter the new environment (university environment) and differences during the college years as they progress in the new environment. It is these developmental differences that differentiate a persister from an attrition case in the particular environment.

The data showing differences in the rates of development at the time the students enter the new environment is best presented in the National

Norms for Entering College Freshmen-Fall 1970 (A.A. Astin, 1970). These data are only measures on the developmental levels of the students at this point in time (i.e., cross sectional representatives). Essentially, the different levels reported are only the accrued results of the differing developmental rates of the students. Differences in age, sex, race, education levels of parents, high school average, rank in class, are some of the reported developmental levels. The National Norms for Entering College Freshmen-Fall 1970 (Astin, 1970) fails to present the rates for the reported developmental levels. Furthermore, Freedman (1965) has indicated that rates of cognitive development differ for each individual. This role may even differ for individuals of a specific age. According to Freedman (1965), more intelligent individuals, in comparison to less intelligent individuals of the same age, not only have greater increases in ability measures but are farther from their maximum limits. These developmental differences for the freshmen males and females from the sampled colleges and universities do, however, demonstrate differences in the developmental rates of the students in the population.

The data showing differences in the developmental rates of the students as they progress through the college years (university or college) are well reported in Astin (1972, 1975), Pantages and Creedon (1978) and Tinto (1975). Essentially, these data show that students with extremely high developmental levels and, hence, extremely high rates of cognitive and affective development voluntarily leave a particular environment (college or university) for another environment more consistent with their rates of development and that students with low developmental levels and, hence, low rates of development are required to leave the given environment because of academic reasons. These data, however, show that some students with low developmental levels can survive in some demanding environments (colleges and universities). Tinto (1975) presents data indicating that students low in affective development (i.e., social interaction) can persist (survive) better in a college or university than students low in cognitive development (academic interaction). Rootman (1972) presents data indicating that students low in affective development (i.e., person-role "fit" or interpersonal "fit" may voluntarily leave the particular environment. These data suggest the existence of appropriate ranges of developmental rates for different environments (colleges and universities).

In sum, both the purpose of higher education in America and the phenomenological evidence support the explicit consideration of a developmental model in the study of college attrition. Such a model shall be considered next.

A Developmental Model

The proposed developmental model is a probabilistic model relating the rates of cognitive and affective development in the separate sexes to the persistence or attrition of students in various intended or actual majors. The model considers the cognitive and affective levels acquired by the individual students up to the point of entry into the new environment (i.e., the antecedent differences), the rates at which the cognitive and affective development are occurring at this point in time, and the sex of the student. Essentially, this model is predicated on the fact that student persistence or attrition is probabilistic as contrasted to deterministic. Furthermore, the rates of development are only ratios of the changes in developmental levels for two successive points in time (i.e., the change in learning or $\Delta \ell$) to the length of the time span separating these two points in time (i.e., the change in time or Δt). Also, these rates of cognitive and affective development or $\frac{\Delta \ell}{\Delta t}$ ratios, are not only different for the individual students over the different aspects of the cognitive and affective domains, but are different for the individual sexes. The relationship between the level of development and the rate of development (learning) is most simply expressed in a developmental (or learning) curve.

The model is as follows:

for a specific intended or actual major of W and a sex of Male (M) or Female (F),

$$\text{Prob}\begin{matrix}\text{Attrition}\\(W, M)\\\text{Semester 1}\end{matrix}(\text{Cell}_{i, j, k, l, m, n, o}) = \frac{\underset{\text{attrition } (W, M)}{\text{freq}}(\text{Cell}_{i, j, k, l, m, n, o})}{\underset{(W, M)}{\text{Total freq}}(\text{Cell}_{i, j, k, l, m, n, o})}$$

and

$$\text{Prob}\begin{matrix}\text{Attrition}\\(W, F)\\\text{Semester 1}\end{matrix}(\text{Cell}_{i, j, k, l, m, n, o}) = \frac{\underset{\begin{matrix}\text{attrition}\\(W, F)\end{matrix}}{\text{freq}}(\text{Cell}_{i, j, k, l, m, n, o})}{\underset{(W, F)}{\text{Total freq}}(\text{Cell}_{i, j, k, l, m, n, o})}$$

The definitions of persistor and non-persistor are open at this point. These categories must, however, be mutually exclusive. For the sake of completeness, a persistor shall be defined as any student that remains as a full-time student to finish his B.A. degree. All students that fail to finish their B.A. degrees shall be viewed as attrition cases. Certainly, these definitions fail to consider the possible types of attrition cases. Attrition cases may be categorized as academically successful or academically unsuccessful. Furthermore, attrition cases may either leave voluntarily or involuntarily.

The cells of $\text{Cell}_{\substack{i,\ j,\ k,\ l,\ m,\ n,\ o\\ (W,\ F)\\ \text{Semester}}}$ are only those cells resulting from the subdivisions of the ranges of the scores for the predictor variables of the antecedent cognitive development (i.e., SAT verbal and SAT Quantitative, High School Average, Rank in Class) and of antecedent affective development,(i.e., California Personality Inventory), the rate of cognitive development (i.e., the total number of quality points -- grade x credit hours-- for the semester), and the rate of effective development (i.e., an inventory of student social activities and a Personality Inventory Scale). These cells address only those students with the given major of W and sex of M or F for the given semester (i.e., Semester 1). By subdividing the ranges of the individual independent variables into class intervals of a small enough size (i.e., the size used in presenting grouped data in a histogram), the scores in the separate independent variables may be viewed in terms of grouped data. The determination of the number of attrition cases in each of the possible 8 dimensional cells resulting from the subdivision to the total number of Males (or Females) in the given 8 dimensional cell is only the proportion of the population with these characteristics (cognitive and affective) in the given major with a given sex for a particular semester lost by attrition. This proportion when viewed in terms of an unchanging population over the subsequent years is the attrition rate in the given major, for the given sex, in a particular semester. These proportions may be viewed as the proportions in a multinomial distribution function.

For semesters beyond the first, the antecedent levels should be represented by the cumulative quality points, the CPI score, and the student's activity index. These antecedent levels are better indicators of attrition than those from high school or those from the time of entry in the university.

It should be noted that this procedure may be more applicable to the HEGIS codes for the majors instead of the majors. The HEGIS Codes are only broad classifications of the majors (i.e., the academic disciplines). These classifications were defined by the National Center of Higher Education Management Systems. For only the 19 classifications emphasized in the State University of New York Statistical Abstracts, Fall 1978, sufficient numbers of students would be available to insure the fullest representation of the anticipated score ranges.

The advantage of the present model is that the resultant measures may be determined for each succeeding semester and entered in the model for that particular semester. Thus, the developmental rate of the student is included in the determination of the student's chances of leaving the particular college environment. If changes designed to retain the individual in the environment are implemented, this model can readily detect the changes in the students leaving the environment.

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Tools for Marketing Management and Enrollment Projection

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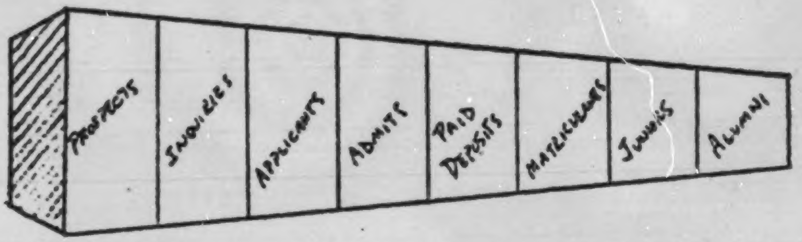
The purpose of this paper is to present a design for the methodological integration of the marketing management, long range enrollment planning and short-term enrollment projection functions. The adoption of a "tools" approach assumes that an effective means of manipulating and presenting large amounts of data is necessary for effective enrollment management. This specific model applies to a large, complex university with a national recruitment effort and academic programs suited to vastly different segments of the student market. The inherent concept is applicable to a variety of institutional situations, and the computer aids are easily adaptable. This model is dependent upon substantial computer support, on-line capabilities, accurate historical data and the presence of supportive administrators.

All too often, it seems that a reluctance to work with the voluminous data necessary to address a myriad of hypothetical enrollment situations results in ignoring pertinent information. A visually effective report, summarizing a complex situation and designed by the people responsible for the research, may assist in developing a facility in using empirical data in decision-making. By developing these computer aids to address specific problems in enrollment and marketing management, we have begun to assemble a methodological framework which ties together different analyses, but at the same time leaves the responsibility for the design and execution of the analyses within individual areas of expertise. Perhaps a more important aspect of this concept is the model's ability to act as an impetus for creative and detailed planning, allowing non-quantitative professionals to contribute to the research which impacts them, to voice their opinions and to receive immediate feedback.

A familiarity with the work performed in admissions areas is essential to the understanding of this model. The piecemeal approach we take in performing the analyses allows for the manipulation of data (and a minimizing of statistical error) in a fashion related to student flow. The Admissions Funnel, a graphic aid utilized by this office, helps to convey this. In its simplest form, the funnel is broken into eight stages: prospects, inquiries, applicants, accepted applicants, paid deposits, matriculants, juniors and alumni. These different stages of conversion, when related to enrollment management, imply the need for different analytical techniques, sources of information, qualitative input, data presentation and levels of decision-making; yet an integrated framework for projecting through the funnel is necessary if timely results are to be obtained.



The individual tools in our model relate to the various stages of the Admissions Funnel. Incorporated into the front end of the model is the ability to geographically segment and project the student market, and carry these segments through the funnel. It also utilizes historical market trends, curricular trends, recruitment objectives and other inferences.

DEMOGRAPHIC PROJECTION MODEL

The Demographic Projection Model (Figure 1) is a computerized routine which serves as the first step in our projection model. It projects high school graduates for the fifty states, the outlying territories, the twenty major metropolitan areas and the total U.S., using data from the National Center for Education Statistics publication, Statistics of Public Elementary

Figure 1

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    HOW MANY YEARS OF DATA DO YOU WISH TO INCLUDE ?

.5
 INPUT WEIGHT FACTORS.  USE THIS FORMAT X.X AND LEAVE 1 (ONE) SPACE BETWEEN VALUES
.1.0 1.0 1.0 1.0

INPUT COLLEGE ENROLLMENT RATE. USE FORMAT XX.X
.45.0



                                      BOSTON UNIVERSITY OFFICE OF ADMISSIONS
                                                                          *
                                          DEMOGRAPHIC PROJECTION MODEL
                                      PUBLIC ELEMENTARY AND SECONDARY SCHOOLS                        09/28/78
REGION - FLORIDA


 GRADE      K        1        2        3        4        5        6        7        8        9       10       11       12  % CHNG COLL ENROLL

ACADEMIC
  YEAR
1973-74   79815   108065   108306   115358   124598   125998   126004   129847   129897   132056   126480   110684    88881  0.00       39996
1974-75   90468   111763   109675   114114   120915   130670   130139   134162   135828   139142   131221   114390    94567  6.40       42555
1975-76   89868   114151   107350   108919   114147   120238   129044   133083   134491   140285   135547   117043    97206  2.79       43743
1976-77  101650   119709   108531   106627   107884   113085   119302   132750   132424   137385   136587   120085   100827  3.83       45417
1977-78   96108   123991   116112   110261   107260   108545   114405   125063   134537   138272   136968   121288   101727  0.79       45777

PROGRESSION
FACTORS       1.284    0.874    1.010    1.011    1.010    1.008    1.041    1.014    1.044    0.984    0.883    0.853        CER = 45.0%

 GRADE      K        1        2        3        4        5        6        7        8        9       10       11       12  % CHNG COLL ENROLL

ACADEMIC
  YEAR
1978-79       0   121490   120420   117298   111444   108280   108172   119078   126799   140434   137109   122248   103501  1.75       46575
1979-80       0        0   116373   121648   118595   112504   108906   113629   120729   132376   138273   122375   104320  0.79       46944
1980-81       0        0        0   113580   122953   119883   113155   113253   115207   126039   130321   123414   104428  0.10       46993
1981-82       0        0        0        0   120884   124124   120375   117775   114827   120274   124082   118316   105314  0.85       47392
1982-83       0        0        0        0        0   122014   124841   125288   119410   119987   118407   110748    99257 -5.75       44666
1983-84       0        0        0        0        0        0   122718   129838   127029   124882   118118   105682    94508 -4.78       42528
1984-85       0        0        0        0        0        0        0   127730   131747   132816   122727   105423    90183 -4.57       40583
1985-86       0        0        0        0        0        0        0        0   129503   137537   130537   108538    89964 -0.24       40484
1986-87       0        0        0        0        0        0        0        0        0   135188   135402   118527    93473  3.90       42063
1987-88       0        0        0        0        0        0        0        0        0        0   133100   120851    98437  6.38       44747

    FOR 5 YEARS OF DATA. 4 WEIGHT FACTORS ARE USED.
    W1 = 1.00  W2 = 1.00  W3 = 1.00  W4 = 1.00  W5 = 0.00  W6 = 0.00  W7 = 0.00   W8 = 0.00

    CER = COLLEGE ENROLLMENT RATE
  * BASED ON A MODEL DEVELOPED BY THE COLLEGE ENTRANCE EXAMINATION BOARD
```
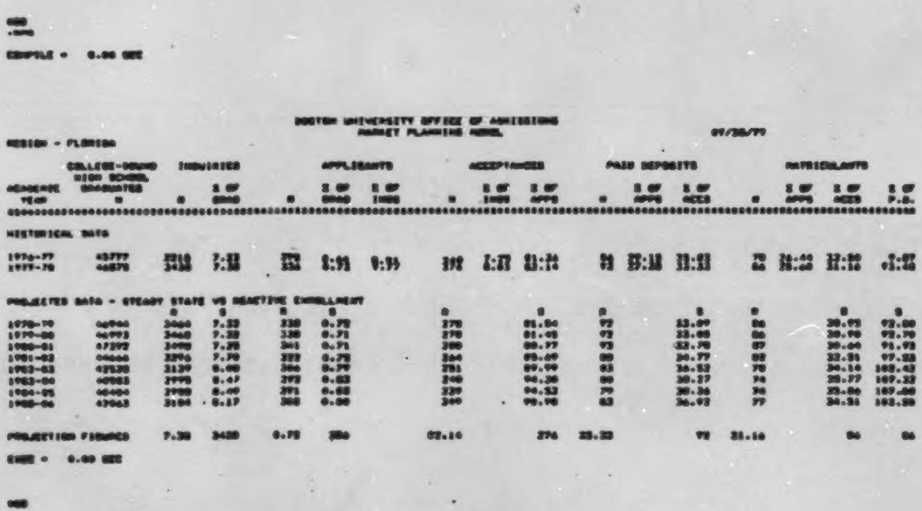

Figure 2



and Secondary Day Schools, and college participation rates from the Admissions Testing Program publication, College Guide to the ATP Summary Reports. The example here shows high school graduates and college-bound seniors from public secondary schools in the state of Florida. The model is based on a similar model developed by the College Entrance Examination Board, which projects enrollment through class levels using an average progression factor. This tool incorporates a weighting mechanism to emphasize economic migration patterns, if it is so desired. The computer program for this and all other computer aids to be discussed is written in FORTRAN, and can be executed from a remote terminal or cathode ray tube (CRT).

There are several weaknesses with this model as it now stands. One fairly simple enhancement would be to incorporate obvious trends in a region's college participation rate into the projection mechanism. Given the disagreement in the profession as to how the current socio-economic situation will affect enrollments in private higher education, we have not utilized this approach. Another more serious problem is the absence of comparable data for private elementary and secondary schools. This being a sizeable portion of our enrollment target, we are currently trying to locate appropriate data.

MARKET PLANNING MODEL

The Market Planning Model (Figure 2) also includes a computerized projection feature, but currently contains no weighting mechanisms or other variable methodology. Input data consists of projected college-bound seniors for a target market from the Demographic Projection Model, and historical admissions data. Whenever possible, the input data can be saved on-line or in secondary storage, and can be easily read into the computer program.

The purpose of the Market Planning Model is to enable a user to draw inferences as to how changing demographic patterns will affect institutional enrollment, all other things remaining constant. The most recent year's market shares, yields and actual values for each stage of the funnel are used to project both a steady state and a reactive enrollment picture. By projecting ahead assuming the need to maintain a steady pool of applicants from a region, one can see the different shares of the market that will be necessary to accomplish this in a period of decline. On the other hand, by projecting ahead assuming a constant market share, one can begin to get a feel for what the new applicant pool will look like given a constant committment of resources to the area.

The same projection methodolgy is applied to each stage of the funnel, using the appropriate conversion ratio to project reactive enrollment (i.e., acceptances as a percent of applicants, deposits as a percent of acceptances).

The possibilities for enhancing the projection methodology of this program are great, when one considers the different affects changes in recruitment strategy and competitive position will have on conversion trends, and how the permutations of these must be examined individually. You may note that applicants here are projected as a percent of prospects rather than as a percent of inquiries. This is because we are still uncertain of the tautologies involved in the generation of inquiries, and our belief that the inquiry pool reacts immediately to preliminary marketing efforts, whereas the applicant pool is a truer picture of institutional enrollment patterns. Recent experience has shown that a dramatic increase in inquiries is not necessarily indicative of a similar increase in applications.

INQUIRY CONVERSION SUMMARY

The Inquiry Conversion Summary (Figure 3) applies the cohort survival technique to each initial source of contact with the institution. This is entirely dependent on a sophisticated system for coding inquiries, and the ability to match the resulting computer file to the admissions and Student Search files. The sources of inquiry shown represent activities such as college fairs, college nights, campus visits, faculty contact, selfgenerated inquiries and Student Search. Of particular interest is the evidence that a direct mailing program through the Student Search Service is not easily evaluated without such a tool. The significant portion of prospects contacted by means of the search, but contacting the University by some other means (19 percent in Florida) is necessary in justifying an expensive (but effective) marketing program.

The Inquiry Conversion Summary has proven to be an effective tool for the evaluation of all recruitment activity. When used in conjunction with the Market Planning Model, it will assist in the allocation of promotion and recruitment funds and the establishment of objectives for each geographic target segment. The use of both state codes and three-digit zip codes allows for both a regional analysis and the evaluation of specific recruiting events. Effective use of these two tools should enable the user to infer what trends will affect individual target segments, and to what degree those trends should be incorporated in an enrollment projection.

Note: Figure 3 was not reproducible. A copy may be obtained from the author upon request.

ENROLLMENT PLANNING MODEL

The Enrollment Planning Model* is a variable methodology computerized projection routine which projects by region the number of freshman candidates accepted to each School and College within the University based on a determination of what educational trends apply to each curricular division and what market trends apply to that region. The model is based on the Enrollment Planning Model which was developed and is being tested by the College Entrance Examination Board. The variable methodology allows the user to choose the market share trend appropriate for individual majors within a region (the most current year, a trend, a weighted average, etc.), and to project ahead five years using the previously mentioned demographic projections.

Individual choices of a basis for projection for each School and College are necessary at Boston University due to the diversity of the undergraduate offerings, their potential to confuse the enrollment planning, the need to differentiate between curricular and demographic trends and the politics involved in establishing individual targets.

This tool has been approved for use by an enrollment committee which represents several areas of the administration. Through it, alternative enrollment strategies can be tested and evaluated by making use of qualitative input and objective data. The process is fast, allowing for informed discussion and timely decisions. A summation of the projections for all of the regions serves as the foundation for a five-year enrollment projection. A top administrative decision as to what rate of matriculation should be maintained, achieved or allowed, again based on a knowledge of market and institutional information, is the final step in the five-year projection.

---

*Figure 4

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                                           BOSTON UNIVERSITY OFFICE OF ADMISSIONS

                                                  ENROLLMENT PLANNING MODEL
                                   MARKET SHARE BY COLLEGE - ACCEPTED FRESHMAN APPLICANTS                     09/28/79
REGION - N Y STATE

PROJECTIONS BASED ON - 1979 SHARE OF MARKET

  YEAR -     1976       1977       1978       1979               1980       1981       1982       1983       1984
                                                                                                                        TOT
COLLEGE      N     %    N     %    N     %    N     %           N % CHNG   N % CHNG   N % CHNG   N % CHNG   N % CHNG   % CHNG
************************************************************************************************************************************


  K/R        513        548        578        606              604 -0.18  607  0.39  597 -1.57  568 -4.64  539 -5.36   -10.98
                0.3431     0.3628     0.3881     0.4050
  CBS        116        137        186        231              230 -0.04  231  0.39  228 -1.57  217 -4.64  205 -5.35   -10.85
                0.0776     0.0907     0.1249     0.1544
  CLA       1014       1203       1379       1501             1497 -0.23 1503  0.39 1479 -1.57 1411 -4.64 1335 -5.36   -11.04
                0.6782     0.7965     0.9260     1.0032
  ENG         89        158        272        400              399 -0.14  401  0.39  394 -1.57  378 -4.64  356 -5.36   -10.94
                0.0595     0.1046     0.1826     0.2673
  SAR         79        111        105         93               93  0.28   83  0.39   92 -1.57   87 -4.62   83 -5.33   -10.53
                0.0528     0.0735     0.0705     0.0622
  SED         85        109         90         96               96  0.26   96  0.39   95 -1.57   90 -4.62   85 -5.34   -10.55
                0.0569     0.0722     0.0604     0.0642
  SFA         86         85         80         81               81  0.36   81  0.39   80 -1.56   76 -4.62   72 -5.33   -10.45
                0.0575     0.0563     0.0537     0.0541
  SMG        128        196        285        329              328 -0.11  329  0.39  324 -1.57  309 -4.64  293 -5.36   -10.92
                0.0856     0.1298     0.1914     0.2199
  SON         53         48         50         44               44  0.88   44  0.38   43 -1.56   41 -4.59   38 -5.30    -8.83
                0.0354     0.0318     0.0336     0.0294
  SPC        116        191        168        181              181  0.02  181  0.39  178 -1.57  170 -4.63  161 -5.35   -10.79
                0.0776     0.1265     0.1128     0.1210
  TOT       2279       2786       3193       3562             3553 -0.25 3566  0.37 3510 -1.57 3346 -4.67 3168 -5.32   -11.06
                1.5243     1.8446     2.1440     2.3807

HIGH SCHOOL
  GRADUATES 149514     151039     148926     149619           148226     149810     147452     140602     133058

EXEC =   0.00 SEC


*GO
```

Figure 4

The portion of the Boston University model which I have discussed conveys the need both to move through the Admissions Funnel using this fragmented approach, manipulating and massaging the data along the way, and also to jump from the first to the fourth stages of the funnel (prospects to accepted candidates) while remaining cognizant of the factors affecting the preliminary conversions. What this translates to is the need to tie the rather abstract notion of marketing for admissions to an actual long range projection of an institution's fiscal stability. This would appear to be a symbiotic relationship, in that seeing the results of their work included in the University's long range planning adds credibility, enthusiasm, and a broader perspective to those responsible for developing an admissions marketing plan, and the use of the model allows the people responsible for the actual long range planning to be in touch with the fundamental realities of the marketplace.

The statistical techniques and marketing approaches, while simplistic, serve as a good starting point. They are what has been used in the past, and are part of an overall message that has been conveyed with varying degrees of success in recent years. The possibility of incorporating other environmental variables into the projections is one possibility. The need to use more sophisticated marketing thought will be obvious to some. The cyclical nature of educational trends, the concept of product life cycle and the notion of strategic thrust could (and indeed should) replace the simple use of fair market share. An awareness of competitive issues and institutional position must be included in any geographic analysis and futuristic projection. Perhaps most important is the need to be comfortable with the application of marketing techniques and terminology, and the realization that what allows there to be a difference between marketing and selling is the fact that there are concerned professionals clarifying the values and goals of the system beforehand.

The aspect of the model that has been instrumental in its success at this institution is its ability to objectively test the subjective, qualitative input of people involved with the student market on a daily basis. The breaking-up of the front end of the marketing function is entirely dependent upon our organizational set-up, inherent management style, and the University's objectives. The possibilities of the tools themselves override most organizational and departmental divisions. To cultivate input from people who actually deal with your student markets, who see the trends before they hit the books, who are responsible for changes in institutional enrollment, can become managable and useful.

Unmentioned as yet is the need to further the scope of this model; to extend the tools and flow of information through the remainder of the funnel. The empirical and intuitive knowledge in the Admissions and Financial Assistance areas should be useful to more than an enrollment planning committee, in order to encompass the true meaning of enrollment management. The sharing of information and research with the Office of Student Life in the area of retention speaks to this extension. The segmentation of student markets in conjunction with development efforts and the organization of alumni is another opportunity. The graphic image of a finite funnel becomes an image of a circular nature. The challenges facing higher education in the next decade may well add a new dimension to the admissions profession. The development and use of the appropriate tools can help in bringing this dimension of extended admissions into the forefront.

An Analysis of Factors Affecting Migration of Freshmen Applicants at Selected Public Institutions of Higher Education in Connecticut

Doreen Frankel[1] and Gary M. Cooley

Connecticut Board of Higher Education

In recent years educational planners and policy makers have become increasingly concerned with reports of a declining population; more specifically, with reports that the number of 18-year-old Americans will decrease nearly 20 percent during the next decade (Magarell, 1978). Whether the decline in college enrollments will follow the decline in the 18- to 24-year-old cohort has been the focus of considerable speculation. Some experts anticipate that enrollment gaps will be filled by older and other nontraditional students (Carnegie Foundation for the Advancement of Teaching, 1975) while others expect an even sharper decline due to a slump in demand for college-educated workers (Dresch, 1975; McPherson, 1978; Shulman, 1977; Nollen, 1979).

Due to an extremely low birthrate, the decline in Connecticut's 18-year-old population will be much more severe than that projected for the nation, however:

> ...the number of high school graduates in Connecticut peaked in 1978 at approximately 47,700 and is projected to drop by approximately 25 percent by 1986 and by 43 percent by 1994. Beginning in 1994, this decline appears to bottom out. The number of high school graduates shows a slight increase in 1995, reflecting the increase in live births in 1977. Whether this increase represents a continuous upward trend rather than an episodic aberration in the decline will depend upon the rate of future births in Connecticut (Frankel, Hagan, & Cooley, 1979a, p. 2).

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[1] This research was based upon a Doctoral Dissertation submitted to the School of Education, University of Connecticut.

In a comparative study of the New England states, it was found that Connecticut enrolls the lowest percentage of residents from other New England states. Connecticut also enrolls the lowest percentages of residents from the states which are the greatest exporters of students to New England--New York, New Jersey, and Pennsylvania. In 1975, Connecticut lost approximately 5,148 students to public institutions in New England, and 16,783 to private institutions in New England (Melican, 1976). At the present time, only New Jersey, New York, and Illinois surpass Connecticut in out-migrating net losses (Grant & Lind, 1978).

With enrollments declining nationally, and with Connecticut losing such a large portion of its potential college population, higher education in Connecticut may suffer profoundly from diminishing enrollments in the not-too-distant future. The need for information on migrating students has become more critical to the New England Region for planning and decision making due to the substantial out-migration patterns in this area, the diminishing number of traditional students in the 18- to 21-year-old age group and the increasing concerns on the viability of growth in adult and nontraditional educational programs (Melican, 1976).

In order to respond to some of these growing concerns about declining enrollment, a number of recent investigations into the causes of non-enrollment following acceptance into specific institutions have been undertaken (Jones, 1975; Carrington & Sedlacek, 1975; Sullivan, 1976). These studies seek to identify factors important in attracting and not attracting students, as well as to compare particular characteristics of the two populations (enrolling and non-enrolling students). Although some of these determinants of choice have been uncovered, (Raley, 1972) very little is known about which individual factors or variables affect these choices.

Purpose of the Study

This study was an attempt to provide insights into the reasons underlying student migratory behavior and to determine whether or not future public policy will be able to influence such behavior. The study sought to ascertain whether differences existed between three groups of accepted applicants to specific institutions of higher education in relation to selected personal, academic, and financial variables. An examination of variables differentiating between the three applicant groups should yield information on which students are leaving Connecticut, why they are leaving, and where they are going. Such an analysis could provide planners and administrators in higher education with information to aid in the development of Connecticut public policy in the area of student migration. Insights into group differences within each of the populations could also provide admissions personnel with information on factors impacting upon student decisions concerning college choice.

Method

A sample survey technique was employed in which questionnaires were sent to 50 percent of the total population of applicants accepted for the Fall 1978 freshmen class of the University of Connecticut, the University of Connecticut Branches, and Central Connecticut State College. The population was stratified into two groups: those accepting and those not accepting offers of admission. On the basis of individual responses to the questionnaire item, "where do you plan to enroll this Fall?", non-enrolling respondents were further partitioned into two groups: Group 2 included students planning to remain in Connecticut to attend an institution of higher education and Group 3 included students planning to attend an out-of-state institution of higher education.

Therefore, for each of three populations, the University of Connecticut, the University of Connecticut Branches, and Central Connecticut State College, there were three groups of accepted applicants: those students choosing to enroll (Group 1), those individuals remaining in Connecticut but turning down admission to the specified institutions (Group 2), and those students enrolling in out-of-state institutions (Group 3).

Overall, 5,369 questionnaires were mailed and 1,901 were returned resulting in a 35 percent response rate which varied between 21 and 44 percent for the respective subsamples. Thus, responses represented approximately 17.5 percent of the total population, with subsamples representing between 10.5 and 22 percent of the subpopulations.

Multivariate discriminant analysis (Cooley & Lohnes, 1962; Tatsuoka, 1970) was chosen as the most appropriate statistical technique for analyzing whether the respective groups could be differentiated from each other on the basis of the variables constituting the multivarite discriminant space. The minimization of Wilk's Lambda was selected as the discriminant criterion and all hypotheses were tested at the P<.01 level of significance.

Results

Table 1 lists the 41 variables which were in the discriminant analysis. Table 2 presents the results of the tests of the general multivariate null hypotheses for the three major populations.

TABLE 1

VARIABLES INCLUDED IN THE DISCRIMINANT ANALYSES

Sex
AAUP Code
Rank of Institution
Institution Control
Institution Type
Prestige of Institution Chosen
Importance of Prestige
Prestige of Surveyed Institution
Campus Visitation
Admissions Officer
Institution's Literature
High School Advisor
High School Teacher
Alumni Recommendation
Influence of Parents or Relatives
Academic Program
Financial Aid
Desire School Close to Home
Other

High School Type
High School Size
SAT - Verbal
SAT - Math
Rank in Class
Receipt of Honors
Extracurricular Activities
Academic Aspirations
Fathers' Education
Mothers' Education
Fathers' Occupation
Mothers' Occupation
Number of Siblings
Only Child
Oldest Child
Youngest Child
Middle Child
Family Income
Parental Expectations
Program Choice Availability

TABLE 2

GENERAL MULTIVARIATE DISCRIMINANT ANALYSIS

UNIVERSITY OF CONNECTICUT

DISCRIMINANT FUNCTION	EIGENVALUE	RELATIVE PERCENTAGE	CANONICAL CORRELATION	FUNCTIONS DERIVED	WILKS' LAMBDA	CHI-SQUARE	DF	SIGNIFICANCE
1	2.11397	86.80	0.824	0	0.2431	1550.267	50	0.000
2	0.32142	13.20	0.493	1	0.7568	305.464	24	0.000

$$\omega^2 \text{ multi.} = 1 - \frac{1111}{(1111-3)\ (1+2.114)\ (1+.321) + 1}$$

$$= 1 - .244 = .756$$

GENERAL MULTIVARIATE DISCRIMINANT ANALYSIS

THE UNIVERSITY OF CONNECTICUT BRANCHES

DISCRIMINANT FUNCTION	EIGENVALUE	RELATIVE PERCENTAGE	CANONICAL CORRELATION	FUNCTIONS DERIVED	WILKS' LAMBDA	CHI-SQUARE	DF	SIGNIFICANCE
1	2.81866	91.01	0.859	0	0.2048	720.629	36	0.000
2	0.27848	8.99	0.467	1	0.7822	111.687	17	0.000

$$\omega^2 \text{ multi.} = 1 - \frac{466}{(466-3)\ (1+2.819)\ (1+.278) + 1}$$

$$= 1 - .199 = .801$$

GENERAL MULTIVARIATE DISCRIMINANT ANALYSIS

CENTRAL CONNECTICUT STATE COLLEGE

DISCRIMINANT FUNCTION	EIGENVALUE	RELATIVE PERCENTAGE	CANONICAL CORRELATION	FUNCTIONS DERIVED	WILKS' LAMBDA	CHI-SQUARE	DF	SIGNIFICANCE
1	2.11904	87.17	0.824	0	0.2443	438.976	40	0.000
2	0.31204	12.83	0.488	1	0.7622	84.597	19	0.000

$$\omega^2 \text{ multi.} = 1 - \frac{324}{(324-3)\ (1+2.119)\ (1+.312) + 1}$$

$$= 1 - .246 = .754$$

For each of the three populations, the University of Connecticut, the University of Connecticut Branches, and Central Connecticut State College, both the first and second discriminant functions were significant beyond the .001 level of confidence. The probability of obtaining group differences this large on the basis of samples drawn from the multivariate discriminant space would be less than one in a thousand for each population. Therefore, since there are significant group differences in each of the three populations, the null hypotheses that group centroids are equal was rejected. Additionally, since the Lambdas associated with all functions were significant, it can be concluded that there are significant differences among the groups within each of three populations along both axes which defined the overall discriminant space.

Since the three general multivariate null hypotheses were rejected, a stepwise discriminant analysis was performed for each population to determine how many of the 41 variables comprising the total discriminant space were associated with each of the discriminant functions. Tables 3, 4, and 5 present the results of the stepwise analyses.

In each of the populations, the first discriminant function primarily accounted for factors differentiating between enrolling students (Group 1) and non-enrolling students (Groups 2 and 3). The variables contributing heavily to this function related most closely to considerations involving prestige and elements of choice entering into college selection; hence, it was identified as a Prestige/Preference function. The second function appears to differentiate the two groups of non-enrolling students from each other, those students choosing other Connecticut institutions (Group 2) from migrant students (Group 3). A singular interpretation of this function

TABLE 3

Function 1: Standardized Discriminant Function

Coefficients: The University of Connecticut

Variable	Coefficient
Institutional Control	.61197
Rank of Choice	-.24007
Type of Institution	-.21524
Prestige of Institution Chosen	.17749
Prestige of Surveyed Institution	-.16510
AAUP Code	-.11644
Institutional Literature	.09676
Desire School Closer to Home	-.08813
Availability of Curriculum Choice	-.08763
Media	.07937
Importance of Prestige	-.07853
Other	.06918
Financial Aid	.06917
Campus Visitation	.05398
Receipt of Honors	-.04972
High School Teacher	.04223
Father's Education	.03800
Friend	.03727
High School Advisor	-.03287
Admissions Officer	.03203
Sex	-.03031
Number of Siblings	-.02544
Middle Area Child	-.02009
Alumni Recommendation	-.00442
Father's Occupation	.00096

Function 2: Standardized Discriminant Function

Coefficients: The University of Connecticut

Variable	Coefficient
AAUP Code	.55909
Type of Institution Chosen	.51338
Desire School Closer to Home	-.38104
Number of Siblings	-.27561
Middle Area Child	.21164
Sex	-.17974
High School Teacher	-.17958
Institutional Control	.14550
Father's Occupation	.14105
Media	-.11259
Financial Aid	-.11045
Rank of Choice (UConn)	.10352
Prestige of UConn	.10197
Availability of Choice	-.09256
Alumni Recommendation	.09086
Prestige of Institution Chosen	-.08634
Admissions Officer	.08300
Institutional Literature	-.06229
Importance of Prestige	.05795
Friend	.05577
Father's Education	-.04668
Campus Visitation	.01618
Receipt of Honors	-.00936
Other	-.00810
High School Advisor	.00319

TABLE 4

Function 1: Standardized Discriminant Function
Coefficients: The University of Connecticut Branches

Variable	Coefficient
Type of Institution	.64813
Prestige of UConn Branch	-.17664
Desire School Closer to Home	-.15756
Rank of Choice (UConn Branch) (reflected)	-.12737
Institutional Control	.11074
Prestige of Institution Chosen	.10920
Parent or Relative	-.09336
Oldest Child	-.07687
Importance of Prestige	-.07559
Youngest Child	-.05493
Academic Program	-.04930
Campus Visitation	.04818
Availability of Choice	-.04697
Institutional Literature	.04694
Other	.02427
Alumni Recommendation	-.02238
SAT-Math	-.02231
Father's Education	.00929

Function 2: Standardized Discriminant Function
Coefficients: The University of Connecticut Branches

Variable	Coefficient
Type of Institution	-.92553
Prestige of Institution Chosen	.51553
Institutional Control	.48430
Father's Education	.30973
Desire School Closer to Home	-.25785
Prestige of UConn Branch	-.24351
SAT-Math	.21493
Other	-.15879
Youngest Child	.15605
Academic Program	-.13740
Alumni Recommendation	.11493
Institutional Literature	.10018
Availability of Choice	-.08128
Rank of Choice (UConn Branch) (reflected)	-.07773
Importance of Prestige	.05227
Campus Visitation	.02911
Oldest Child	.02002
Parent or Relative	-.01018

TABLE 5

Function 1: Standardized Discriminant Function
Coefficients: Central Connecticut State College

Variable	Coefficient
Rank of Choice (CCSC) (reflected)	.38569
Institutional Control	-.36896
Type of Institution	.33927
Prestige of CCSC	.30170
Prestige of Institution Chosen	-.29636
Campus Visitation	-.14377
Desire School Closer to Home	.09650
AAUP Code (reflected)	-.08914
Academic Aspirations	-.08168
Alumni Recommendation	-.06811
Number of Siblings	-.06639
Youngest Child	-.06326
Fathers' Occupation	-.04665
Other	-.04505
Mothers' Education	-.04077
Parent or Relative	.03471
Institutional Literature	-.03218
Importance of Prestige	-.01097
Fathers' Education	.00344
SAT-Verbal	-.00150

Function 2: Standardized Discriminant Function
Coefficients: Central Connecticut State College

Variable	Coefficient
Institutional Control	-.69246
Prestige of CCSC	-.46126
Fathers' Education	.45087
Prestige of Institution Chosen	.38949
SAT-Verbal	.33558
Campus Visitation	-.32844
Institutional Literature	-.28975
Type of Institution	-.27753
Mothers' Education	-.27567
Importance of Prestige	.24191
Fathers' Occupation	-.20793
Other	-.19751
Rank of Choice (CCSC) (reflected)	-.19265
Parent or Relative	-.15323
Number of Siblings	-.12527
Youngest Child	.10177
Alumni Recommendation	-.10174
Academic Aspirations	.05909
Desire School Close to Home	-.05453
AAUP Code (reflected)	-.00383

was generally not possible since it appeared to be comprised of several components including prestige and preference variables, socioeconomic variables, and external influences. This complex second function, although difficult to define, appears to be an attitudinal function which is related to socioeconomic status and an orientation toward private higher education.

Classification of Individuals

The discriminant analysis provided by SPSS permits, as a subroutine option, the classification of individuals into their most probable groups based upon the information contained in the overall reduced discriminant space. Thus, it is possible to compare the actual known group membership of individuals with their predicted or assigned group membership.

Table 6 presents the results of the classification analysis and compares the congruence of predicted group membership with actual group membership. Based upon the information contained in the reduced discriminant space, 83.9 percent of all individuals were correctly classified into their respective groups.

Results and Implications

Despite rapid expansion of its higher education system, as well as its student financial assistance programs, Connecticut continues to be one of the top five states in student migration. Losing approximately one half of its college-going high school graduates to other states (Frankel, et al., 1979b). In view of the fact that these migration patterns have been relatively stable over the past 17 years, it seems

TABLE 6

Prediction Results

THE UNIVERSITY OF CONNECTICUT

Actual Group	No. of Cases	Predicted Group Membership Group 1	 Group 2	 Group 3
Group 1	494.	491. 99.4%	0. 0.0%	3. 0.6%
Group 2	129.	21. 16.3%	61. 47.3%	47. 36.4%
Group 3	488.	65. 13.3%	39. 8.0%	384. 78.7%

Percent of "Grouped" Cases Correctly Classified: 84.25%

THE UNIVERSITY OF CONNECTICUT BRANCHES

Actual Group	No. of Cases	Predicted Group Membership Group 1	 Group 2	 Group 3
Group 1	201.	199. 99.0%	2. 1.0%	0. 0.0%
Group 2	104.	19. 18.3%	57. 54.8%	28. 26.9%
Group 3	161.	8. 5.0%	25. 15.5%	128. 79.5%

Percent of "Grouped" Cases Correctly Classified: 82.40%

CENTRAL CONNECTICUT STATE COLLEGE

Actual Group	No. of Cases	Predicted Group Membership Group 1	 Group 2	 Group 3
Group 1	168.	163. 97.0%	5. 3.0%	0. 0.0%
Group 2	112.	22. 19.6%	67. 59.8%	23. 20.5%
Group 3	44.	1. 2.3%	7. 15.9%	36. 81.8%

Percent of "Grouped" Cases Correctly Classified: 82.10%

reasonable to conclude that neither the lack of access to higher education nor the absence of student financial aid programs have been the primary causal factors of Connecticut's extremely high student out-migration.

From the results obtained in the present study, there is evidence which suggests that for many students it is not a matter of access, per se. Rather, the type of educational opportunity being offered is either not acceptable or less acceptable than the opportunities being offered by other institutions.

The most compelling and consistant result of the present study involved the concept of prestige. The assessment of institutional prestige clearly dominated the results of the three major discriminant analyses and consistantly appeared as a major factor in the decision-making behavior of students. Students who elected to enroll in the institutions included in this study reported that prestige was a major consideration in their decision. Similarly, students electing not to accept offers of admission reported that institutions they had chosen to attend were more prestigious.

Despite Connecticut's remarkable achievement toward providing universal access, simply making higher education accessable is not a sufficient achievement unless it is accompanied by the opportunity to participate in a diverse set of educationally, socially, and economically relevant programs of appropriate quality. This issue of prestige leads to the need for an investigation into the relationship between perceived prestige and quality in Connecticut higher education.

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A METHODOLOGY FOR INSTITUTIONAL PROJECTIONS OF FULL-TIME UNDERGRADUATE ENROLLMENTS

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I. INTRODUCTION

This paper describes a cohort survival model, residing in a computer program at the New Jersey Educational Computer Network (NJECN), to produce projections of full-time undergraduate enrollments in a college.[1]

The projection methodology used applies a transition rate to a count of students in a certain pool, and the product represents a new count of students who "survived" the transition period. The "survivors" can include counts of people from pools other than the one to which the rate is applied. For instance, the transition rate which uses current public high school graduates as a reference includes, in addition to current public high school graduates, graduates from private high schools, high school graduates from previous years, and non-graduates who have earned a General Equivalency Diploma (GED).

The cohort survival model consists of three successive stages of flow and/or projections: the first establishes the first-time full-time freshman cohort entering the college from each New Jersey county or from out-of-state. The second stage moves these students together with other cohorts including students transferring into the college without a degree from another institution, students who have "stopped out" and subsequently return to the institution (readmits), spring enrollments, and part-time students who return as full-time students through the four years (two years for community colleges) of each undergraduate class level to graduation. The third stage of the model aggregates class level enrollments to compute the total undergraduate enrollment at the institution for each academic year between 1977 and 1995.

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[1] The program uses the State Planning System (SPS) software package developed by the National Center for Higher Education Management Systems (NCHEMS).

II. PROJECTION METHODOLOGY OVERVIEW

Figure 1 is a chart describing the flow to graduation of the cohort of first-time full-time students entering a college. The model computes year-to-year enrollments, beginning in 1977 and continuing through 1995. The computer program starts with actual 1976 enrollments. The values of the parameters necessary for the operation of the model are determined by the institution. The set of model parameters can be derived from data normally provided by the institution to the Department by means of HEGIS reports.

The computer model advances from year-to-year, determining the new first-time student cohort from each county, advancing the current freshman, sophomore and junior classes to the next class level for the next academic year, adds students who enroll at each class level in addition to the continuing students, adds transfer students to the third year enrollments at the senior institutions, and finally determines the number of unclassified (by class level) students at the college. The classified and unclassified students are aggregated to obtain the total college enrollment for the year.

III. SIMULATION STUDIES

The model provides an institution with the capability to change parameters which are a function of institutional policy and procedures. These parameters include:

1) the College-Going-Rate, by county, of residents enrolling full-time at the college;

2) the proportion of out-of-state students enrolling as first-time freshmen;

3) the class-to-class continuation (retention) rates;

4) the proportion of readmits, non-degree transfers, etc. to "continuing students;"

5) the size of the transfer cohort (with associate degree); and

6) the proportion of unclassified students to classified students.

If an institution uses historical data to establish the values of the model parameters, it will produce enrollments based essentially on maintaining the "status quo." The institution can change the model parameters in response to institutional plans, policy changes, and resource allocation and determine the impact of these system changes on future enrollments. In making changes, particularly with respect to College-Going-Rate, each institution should recognize that there will be competition for students from other New Jersey institutions as well as institutions in other states.

Appendix A is a summary of the model variables and parameters and their associated symbols.

Appendix B presents, for a typical two-year and a four-year college, the data required for the model and the computation of the model parameters from the data.

Appendix C is an enrollment projection report (simulation results) for the four-year model college, and includes the values of the input variables and parameters, as well as year-to-year projections of the various student cohorts.

Appendix D is a listing of the equations used to model the flow diagram of Figure 1.

Appendix E contains sample forms for compiling institutional data in a format that will allow for easy input to the computer program.

NOTE: Appendices can be obtained from the authors.

IV. DEVELOPING POOLS

There are three basic pools, or groups, of students that are required by the model: high school graduates, first-time full-time freshmen, and transfer students (with A.A. or A.S. degrees).

A. High School Graduates

A cohort survival methodology was used to project the numbers of New Jersey public high school graduates, by county, from 1977 through 1995. The projection methodology is described in detail in the report, "Full-Time Undergraduate Enrollment Projections, 1977-1995 Technical Report."[2]

Table I presents the actual and projected public high school graduates for the period 1966-67 through 1994-95. Figure 2 presents the same information in graphical form.

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[2] Prepared by the New Jersey Statewide Plan "Demand" Subcommittee (#1A), May 1979

B. First-Time Full-Time Freshmen

1. New Jersey Residents - The projection model begins by calculating the number of entering first-time freshmen to the college from each county in New Jersey. College-bound students from a county are computed by multiplying the number of high school graduates from the county by the county "College-Going-Rate." The College-Going-Rate (CGR) for a county is defined in this model as the ratio of all first-time full-time freshmen students from the county enrolled in the institution in the fall of academic year k to the number of public high school graduats from the county in the previous academic year (k - 1). In addition to current public high school graduates, the first-time full-time freshman cohort includes graduates of private and parochial schools, students who graduated one or more years ago from a public or private high school, and students who hold a G.E.D.

In mathematical notation, the College-Going-Rate (CGR) for county j in year k is defined as:

$$CGR_{kj} = \frac{FTFTF_{j,\,(k)}}{HSG_{j,\,(k-1)}} \qquad (1)$$

where

$FTFTF_{j,k}$ = County j residents enrolled in academic year k as first-time full-time freshmen at the college (includes current and previous public high school graduates, current & previous private high school graduates, G.E.D. holders, etc.)

$HSG_{j,k-1}$ = New Jersey public high school graduates from county j during academic year k-1

2. Current New Jersey Public High School Graduates - The number of current high school graduates enrolling as first-time freshmen is not required in the model, but it is desirable to have this information in order for a college to plan freshmen recruitment strategies and monitor the "interest" of high school graduates to attend college. Data on current high school graduates enrolling in college, by county, are not collected as a part of the New Jersey State Level Information Base. Each college, however, should have this information available from their student records.

In mathematical notation, the college-participation rate of current public high school graduates (CPR) from county k_j in year k is defined as:

$$CPR_{k_j} = \frac{CHSG_{j,k}}{HSG_j(k-1)} \qquad 1\ (a)$$

where

CHSG = County j public high school graduates who graduated from high school the previous year (k-1) and enrolled in the college in year k.

3. Out-of-State Residents - The numbers of out-of-state residents enrolled as first-time full-time freshmen in New Jersey is computed as a function of the total first-time full-time freshman enrollment. The percentage of out-of-state first-time students, compared to total first-time students is a policy variable (i.e., it can be changed from one simulation to the next or it can change from year-to-year within a single computer run) in the model.

C. Transfer Students

Transfer students with an A.A. or A.S. degree are included in the model as a separate variable. The number of transfers without a two-year degree, however, are implicitly included in the model by means of class level "adjustment factors" (See Section V). The number of "Degree" transfers is a policy variable in the model and, therefore, can be established by the institution.

V. THE FLOW OF STUDENT COHORTS WITHIN A COLLEGE

The year-to-year total institutional enrollment is a function of the previous year class size and the year-to-year student continuation (retention) rates. In the projection model, four continuation rates are used (two for the two-year colleges): freshman to sophomore, sophomore to junior, junior to senior, and senior to graduation.

A. Freshman Class

The New Jersey entering first-time freshmen are determined by multiplying the CGR times the number of high school graduates from each county The percentage of out-of-state first-time freshmen to total first-time freshmen is available as a policy variable and is used to compute the number of out-of-state residents enrolling in the freshman class. The New Jersey and out-of-state first-time full-time freshmen comprise the total first-time full-time freshman enrollment.

The first-time full-time freshman cohort does not include students who have been readmitted as freshmen, transfer in as freshmen or convert from a part-time to full-time attendance status as freshmen. To add these student cohorts, the first-time freshman enrollment is multiplied by a freshman class "adjustment factor" in order to compute the size of the total freshman class. The freshman "adjustment factor" is defined as the ratio of all full-time freshmen to the number of first-time freshmen. This "adjustment factor" can be derived from historical data of total freshmen and total first-time full-time freshmen.

B. Sophomore Class

A certain proportion of the full-time freshman cohort continue as full-time students to the sophomore year. This proportion depends on continuation rate, defined as the ratio of the number of full-time students who enrolled in year (k) to the number of these students who were previously enrolled in year (k-1) as full-time students. This continuation (or retention) rate multiplied by the total freshman class generates the "freshman continuing to sophomore" cohort.

In order to determine the size of the total sophomore class, we must add sophomores who are readmits, transfers, previously part-time now enrolled full-time, and so forth. The ratio of the size of the total sophomore class to the number of "continuing freshmen" is defined as the sophomore class "adjustment factor." The product of the "adjustment factor" and the "freshmen continuing to sophomore" cohort generates the total sophomore class.

C. Junior Class

We determine the number of sophomores continuing to the junior year in a manner similar to the computation of freshmen continuing to the sophomore year. For the junior year at the senior institutions, we must also add the cohort of transfers with an A.A. or A.S. degree. Since transfers with degrees, plus the continuing sophomores, do not comprise the entire junior class, we must again make an adjustment for other cohorts such as readmits and non-degree transfers. The ratio of the total junior class to the number of continuing sophomores plus transfer students is the junior "adjustment factor" and can be determined from historical data.

D. Senior Class

The transition rate from the junior to the senior year and the senior class "adjustment factor" are computed in a manner similar to the computation of these parameters for the freshman and sophomore classes. These parameters, together with the junior class enrollments of the previous year, are used to compute the size of the current year's senior class.

E. Unclassified Students

Because of incomplete transfer records, unreported grades, and other problems, it is often not possible to identify the class level for many students enrolled in a college. The proportion of these "unclassified-by-level" students at a college is reasonably constant. Thus, a ratio of the number of "unclassified students" to the college's total "classified" enrollment can be applied as an adjustment factor to the "classified" student cohort to obtain the numbers (cohort) of "unclassified" students. Multiplying this ratio times the total classified enrollment, we can project the numbers of unclassified students. We can then compute the total college enrollment by adding the unclassified to the classified enrollments.

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F. Graduates

The number of graduates is determined by using graduation rate defined or the ratio of graduates to the number of seniors. The graduation rate can be determined from historical data on the number of graduates compared to the total senior class enrollments. The product of graduation rate and senior enrollments yields the number of graduates for that year.

VI. DATA

Eight data sets are necessary to determine model parameters:

A. High School Graduates

The number of public high school graduates by county is an input variable to the model. The projections of public high school graduates from 1977 to 1994, by county are available from the Department of Higher Education's Office of Planning and Research.

B. First-Time Full-Time Freshmen

First-time full-time freshmen enrollments by county of residence are available from HEGIS Form 204xx[3]. This historical data can be used for the computation of reference values of the county "College-Going-Rates" (CGR). The CGR is a policy variable in the model.

C. Out-of-State Enrollments

Out-of-state enrollments, as well as the total enrollment of first-time full-time students, are available from HEGIS Form 204xx. The ratio of out-of-state first-time full-time freshmen to total first-time full-time freshmen is included in the model as a policy variable.

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[3] The last two characters of the N.J. HEGIS forms specify the fall of the year of data collection. The colleges should use reference data for the years (or average of several years) that they consider to be most appropriate for their projections.

D. Full-Time Continuation Rate

The number of full-time students, by class level, who were enrolled full-time in year k and enroll again as full-time students in year k + 1 are available from HEGIS Form 301xx. Some of the returning students remain at their previous class level, but the great majority advance to the next class level. For example, some of the full-time freshmen enrolled in a college in the fall of 1976 will return as freshmen in the fall of 1977, while others return as members of the sophomore class. The ratio of enrollments, by class level, in year k + 1 to enrollment of the same students in year k, using data from HEGIS 301xx, is an approximation of the class level "continuation" rate. The colleges should have detailed data on their continuing students and, therefore, can compute actual class-to-class "continuation rates." Historical data can be used to establish reference values for the "continuation rates" for each class level. The "continuation rates" are available as policy variables in the model.

E. Enrollment by Class Level

Enrollments by class level are available from HEGIS Form 205xx or US HEGIS 2300-2.3 for each year. The ratio of total enrollments, by class level, to the number of "continuing students" from the previous year is defined as the "adjustment factor" for that class level.

F. Transfer Students

The number of students with Associate Degrees transferring to four-year institutions from two-year institutions is available from HEGIS Form 303xx. Only those transfers with degrees are included in the model as an explicit cohort.

G. Graduates

The number of graduates is available from HEGIS Form 2300-2.1. The historical ratio of graduates to senior enrollments (sophomores for two-year colleges) can be used as the reference value for the college's "graduation rate."

VII. THE MATHEMATICAL MODEL

The model variables and parameters and their symbols are presented in Appendix A. The distinction of "static," "dynamic," and "exogenous" variables is a requirement of the SPS software. The modeling equations are presented in Appendix B.

The following dynamic variables are required for the first year (initial year) of the model:

- D1 to D21 - "In-State First-Time Students Enrolling by County"
- D22 to D42 - "In-State Current Public High School Graduates Enrolling by County"
- D43 - "Sophomores who were Enrolled as Freshmen the Previous Year"
- D44 - "Juniors who were Enrolled as Sophomores the Previous Year"
- D45 - "Seniors who were Enrolled as Juniors the Previous Year"

In addition, the model requires values for:

- E1 to E21 - "County Public High School Graduates" for the Academic Year previous to the first year of the projections, and
- E22 - "AA/AS Degree Holders Who Transfer into the Junior Year at the College"

E1 to E21 are stored in the computer program for academic years 1975-76 through 1995-96, and therefore do not need to be entered as data in order to use the model.

The model parameters must be specified for the initial year as well as for each subsequent year of enrollment of projections.

The college has the option to initialize the model for any academic year prior to 1979-80. It is suggested that 1975-76 be selected as the initial academic year in order to provide several years of comparative information between actual and projected enrollments and thereby provide some guidelines for "fine-tuning" the model and improving the reliability of the enrollment projections.

Values of the model parameters can differ from year to year. In selecting model parameters, however, a college should consider historical data trends as well as institutional policies and plans established to achieve institutional enrollment goals during the next decade.

As a first estimate of future values of such model parameters and variables or college-going rates, retention rates, and transfer enrollments, the college can use current values of these parameters or variables, an arithmetical average over several years, or a weighted average such as a Fibonacci series. In any case, it should be recognized that current trends tend to continue and several years are often required to produce an enrollment change as a result of changes in institutional policy, actions, or programs.

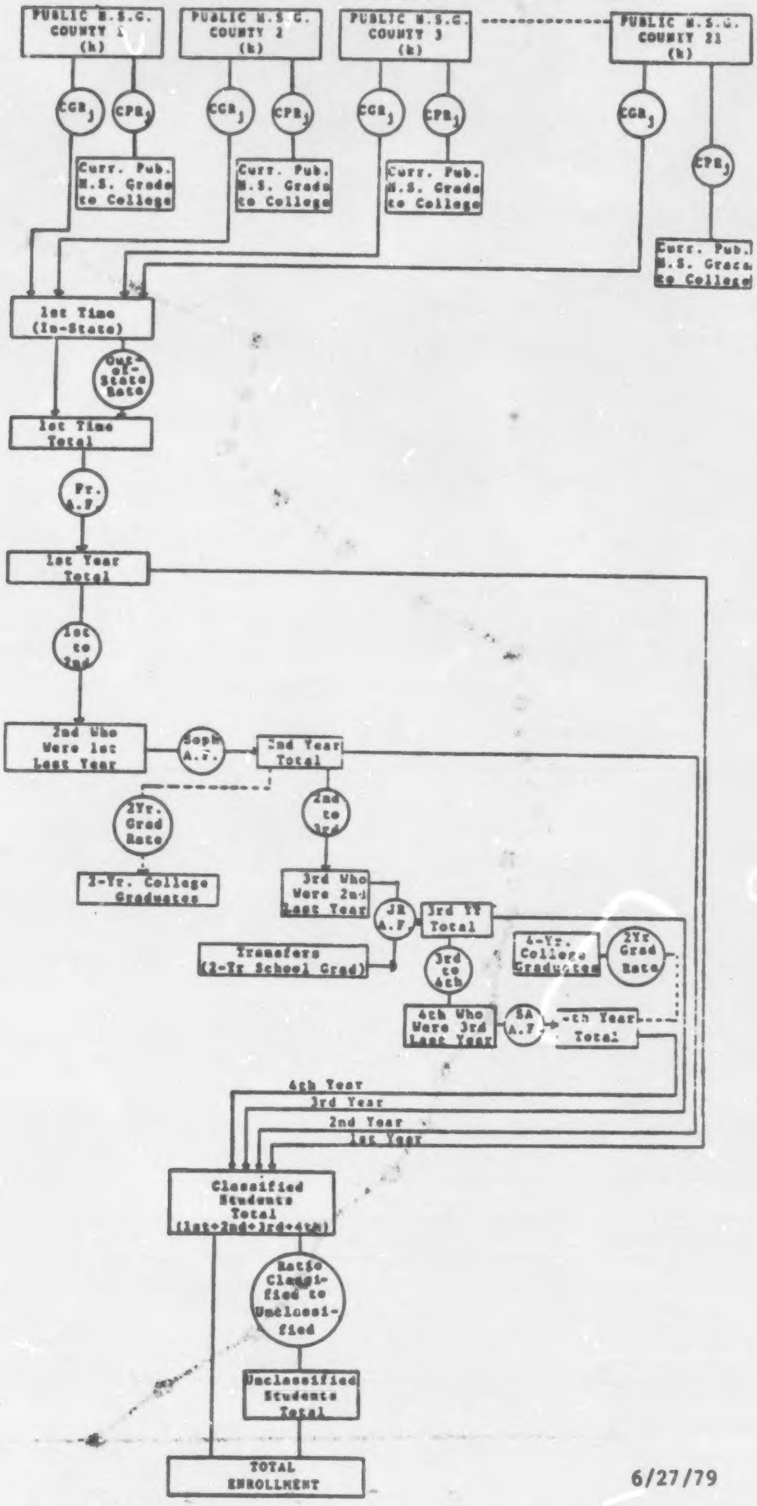
TABLE I

ACTUAL AND PROJECTED NEW JERSEY PUBLIC HIGH SCHOOL GRADUATES

Academic Year	DHE Projections Number of High School Graduates
Actual	
1966-67	74,476
1967-68	78,444
1968-69	83,407
1969-70	86,498
1970-71	87,718
1971-72	91,810
1972-73	93,146
1973-74	94,380
1974-75	97,985
1975-76	97,494
1976-77	98,548
Projected	
1977-78	98,001
1978-69	99,487
1979-80	98,300
1980-81	98,315
1981-82	98,258
1982-83	93,930
1983-84	89,016
1984-85	85,531
1985-86	82,340
1986-87	83,428
1987-88	84,518
1988-89	77,867
1989-90	71,451
1990-91	68,330
1991-92	68,831
1992-93	67,037
1993-94	66,621
1994-95	69,323

FIGURE 1

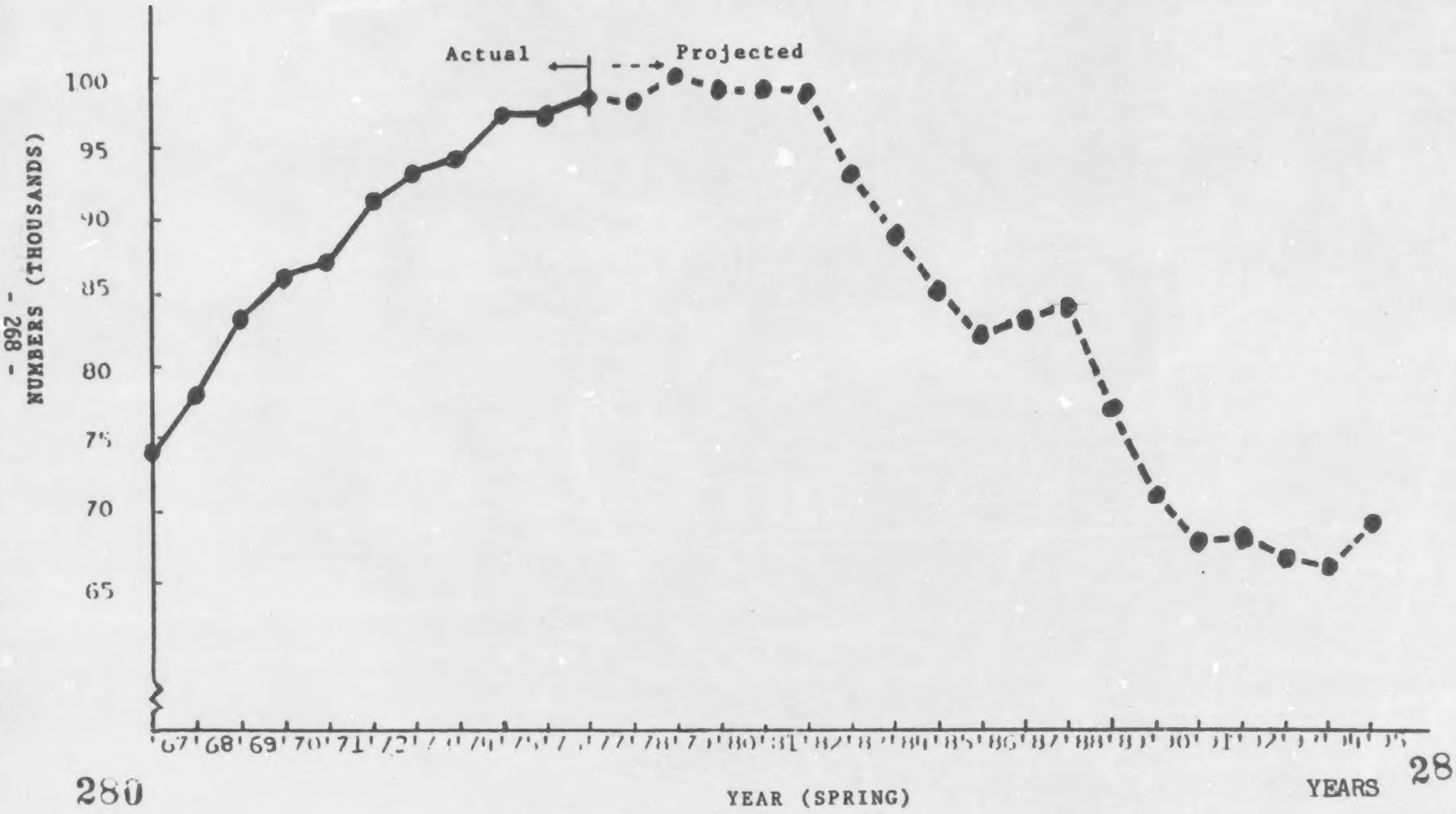
INSTITUTIONAL FULL-TIME STUDENT PROJECTION MODEL (FLOW DIAGRAM)


PUBLIC H.S.G. COUNTY 1 (h)
PUBLIC H.S.G. COUNTY 2 (h)
PUBLIC H.S.G. COUNTY 3 (h)
PUBLIC H.S.G. COUNTY 21 (h)
CGR$_j$
CPR$_j$
Curr. Pub. H.S. Grads to College
1st Time (In-State)
Out-of-State Rate
1st Time Total
Fr. A.F.
1st Year Total
1st to 2nd
2nd Who Were 1st Last Year
Soph A.F.
2nd Year Total
2Yr. Grad Rate
2-Yr. College Graduates
2nd to 3rd
3rd Who Were 2nd Last Year
JR A.F.
3rd Yr Total
Transfers (2-Yr School Grad)
4-Yr. College Graduates
2Yr Grad Rate
3rd to 4th
4th Who Were 3rd Last Year
SR A.F.
4th Year Total
4th Year
3rd Year
2nd Year
1st Year
Classified Students Total (1st+2nd+3rd+4th)
Ratio Classified to Unclassified
Unclassified Students Total
TOTAL ENROLLMENT

6/27/79

FIGURE 2

NEW JERSEY PUBLIC HIGH SCHOOL GRADUATES
1967-1995



OPR-5/23/79

PERCEPTION: IS IT JUST IN THE MIND OF THE BEHOLDER?

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Introduction

As the expected decline in enrollment is slowly descending upon us, there is an increase in competition among institutions of higher education. Every college and university is expanding its recruiting efforts to get the best share of its contracting student market. Each high school senior starts out with an ideal institution that he or she would like to attend. The college choice process begins with inquiry, application, admission and finally enrollment. In any marketing strategy it is important to have an accurate knowledge of what prospective students want. The best way to find out is to ask them.

Methodology

At Carnegie Mellon University (CMU) admissions research has been carried out for the past several years. Surveys were sent to all the admitted applicants immediately after the final date for accepting admission. They were asked to list all the institutions to which they applied and were accepted. They were asked extensively about their sources of information about CMU. Finally, enrollees compared CMU and their second choice school on various institutional characteristics like reputation, physical appearance of the campus and social life. The non-enrollees compared their school and CMU on the same factors. In 1978, 3310 students applied for admission at CMU. 64% of the applicants were admitted. 50% of the admittees enrolled at CMU. 2117 surveys were mailed to all admittees. A total of 1,052 responses (50%) were received from two mailings. Of this 58% were from enrollees and 42% from the non-enrollees. The lower response rate for non-enrollees was not a surprise.

The first part of the study was to analyze the institutions recruiting from a common market by their share of applicants, admittees and enrollees. In the second part, the institutional characteristics were studied using the students' ratings of the similarities between the institutions. This paper reports the latter, the peception study from the 1978 data.

Perceptions of Enrollees vs Non-enrollees

Institutions were compared on 15 factors on a 5 point scale where '1' was unsatisfactory and '5' was excellent. The mean ratings of CMU are listed in Table 1. To quote Anderson (1976), "Students typically claim they chose their college to secure vocational training or to develop their minds; specifically, they were attracted by "good faculty", "high scholastic standards", and "special curriculum" (Baird, 1967)."[1] The results support this pattern with high scores for academic and reputation factors both from enrollees and non-enrollees, thus highlighting the strengths of CMU. On all factors the perceptions of enrollees are more positive than that of non-enrollees. Cost, however, was rated the lowest.

Table 1

Mean Ratings of CMU

	Enrollees	Non-Enrollees
General Reputation	4.8	4.4
Teaching Reputation	4.7	4.4
Career Preparation	4.7	4.4
Research Reputation	4.6	4.2
Reputation of Alumni	4.6	4.3
Availability of Area of Interest	4.6	4.2
Admissions Standards	4.5	4.2
Size of School	4.3	4.0
Attractive Campus	3.9	3.3
Distance from Home	3.8	3.3
Extracurricular Activities	3.8	3.7
Social Life	3.8	3.6
Athletic Program	3.6	3.5
Student Housing	3.4	3.3
Cost	2.8	2.8

Scale Used: Unsatisfactory 1 2 3 4 5 Excellent

75% of the respondents had visited the campus before making decisions. The significant differences are listed in Table 2. Those who visited had better perceptions of distance and academic programs while their ratings of the physical attributes of the campus are lower than those who did not visit.

Table 2

Mean Ratings by Visit

	Enrollees		Non-Enrollees	
	Visited	Did Not Visit	Visited	Did Not Visit
Distance	3.8	3.3	3.4	3.2
Field of Interest	4.7	4.4	4.1	4.2
Attractive Campus	3.9	3.9	3.2	3.7
Student Housing	3.4	3.5	3.2	3.6

A comparative statistic, the rating difference between the first and second choice institutions on similar factors, is a good measure of institutional attractiveness. Table 3 lists the mean rating difference of enrollees. Positive differences indicate stronger characteristics of CMU while negative ones reflect the weaker. The academic and reputation factors are rated higher for CMU. Student housing and athletic programs are less favored. Cost again is the lowest rated. This clearly indicates that enrollees were making a trade-off to get good quality education. This result was also established by a study of high school seniors by Jerry Davis and William Van Dusen. They found that the students are willing to sacrifice lower costs and the right size to maximize graduate school preparation and career preparation at major private schools.[2]

Table 3

Differences of Mean Scores
in Comparing CMU and the Competitors

Factors	Mean Rating Difference of Enrollees
Size of School	.9
General Reputation	.8
Teaching Reputation	.8
Research Reputation	.8
Alumni Reputation	.8
Admissions Standards	.8
Career Preparation	.7
Availability of Area of Interest	.4
Distance	.3
Student Housing	- .1
Athletic Programs	- .4
Cost	- .6

Analysis by Market Segmentation

Along with personal preferences, types of institutions being compared also influence the rating. Over 300 institutions were listed by the students. They varied from community colleges to the Ivy League schools. There was no homogenity either among all of the institutions or among all of the students. It therefore made more sense to segment this market by some common characteristics and identify the differences and concerns of different groups. "The people in different segments are differentially responsive to particular product/service characteristics, including price and quality; they can be reached through different information media and service delivery arrangements, or can be appealed to through different promotional programs and content. For efficient and effective marketing, the identification of these segments and the structure of the consumer market is an important research task."[3]

John Maguire and Robert Lay at Boston College grouped the competing institutions by their selectivity and analyzed student perceptions.[4] At CMU, this method was expanded to two dimensions: the yield ratio and student quality. Only the top 50 institutions by joint admissions were included in the analysis. The yield ratio is used as a measure of institutional success among the competitors. The yield ratio of CMU with a school is the ratio of the number of students enrolled at CMU to the total number of students enrolled either at CMU or the competitor. If the yield ratio is greater than 0.5, then CMU enrolls more students than the competitor from the common pool of admittees. The average SAT scores of the respondents was used as a student quality measure.

The SAT scores were divided into three ranges as Lower (540-599), Average (600-649) and Higher Quality (650-699) and the yield ratio into Low (0-.5), Medium (.51-.70) and High (.71-1.00) yield. Table 4 illustrates how the top 50 schools were partitioned along these dimensions. The first number in each cell is the number of schools in that category. The number inside the parenthesis is the number of joint admits with that group of institutions. Two schools from each group are listed to show the type of institutions that were grouped together. More public schools were in the High Yield Lower Quality group and more prestigious schools were in the Low Yield Higher Quality group. Most of the schools in the middle column (Average Quality) were similar to CMU in quality, especially those with low and medium yield rates.

Table 4

Schools and Enrollees by Groups

SAT Scores	LQ (540-599)	AQ (600-649)	HQ (650-699)
Yield Ratio			
LY (0 - .50)	1 (9) RISD	8 (127) RPI Northwestern	6 (89) MIT Princeton
MY (.51 - .70)	4 (20) U. of Mich. NYU	11 (94) Lehigh Bucknell	
HY (.71 - 1.00)	13 (272) Penn State Syracuse	6 (62) Case Western Drexel	1 (2) Rose Hulman

Discriminant analysis was used to explore some of these groups individually, with the 15 factor ratings of CMU as discriminating variables. This technique searches for a pattern in the responses that would differentiate the enrollees and the non-enrollees. It selects and weights the factors that best predict the final choice. This analysis enables a researcher to extract the few important characteristics that seemed to contribute to the final enrollment decision by group. The classification results and the factors with significant weights are listed in table 5. A high percentage of students were classified correctly as enrollees or non-enrollees except for the Medium Yield-Average Quality group. The institutions in this group are comparable in size, quality and reputation and hence stronger competitors. The lower rate of classification indicates the perception overlap as the choice gets harder.

Table 5

Major Discriminant Coefficient Signs by Groups

Factors	LY AQ	LY HQ	MY AQ	HY LQ	HY AQ
Cost				+	
Distance from Home	+	+		+	
General Reputation	+		+		-
Teaching Reputation		+			+
Research Reputation			-		+
Reputation of Alumni			+		
Admissions Standards		-		-	-
Avail. of Area of Interest	+	+		+	+
Size of School		+			
Attractive Campus	+	+	+	+	
Student Housing		-		-	
Extracurricular Activities				-	-
Social Life			+		
Athletic Programs			-		-
Percent Correctly Classified					
Enrolled	83	90	68	73	91
Non-Enrolled	80	84	65	66	91

For clarity, only the signs of the weights are listed along with the factors. A positive sign indicates a positive loading and a negative sign, a negative loading. A student rating CMU highly on the factors with positive loadings is likely to be an enrollee. The non-enrollee would rate higher on the factors with negative loadings and lower on the ones with positive loadings. Distance, general reputation, academic program availability and campus appearance seem to be important across the groups. Cost is significant only for the High Yield-Lower Quality group where more public institutions were an alternate choice. Facilities, size of school and teaching reputation were also important for the Low Yield-Higher Quality group. The students in the Medium Yield-Average Quality group may have been discouraged by research.

Comparison with Other Studies at CMU

The perception study was done previously in 1974. Table 6 compares the responses on identical factors. Cost is perceived better in 1978, probably due to the following reasons. The increase in tuition rates is lower at CMU compared to the top competitors. Also 60% of the students receive financial aid. The decrease in rating for distance can be explained by the geographic market expansion of applicants. A good example of marketing strategy is the favorable change in research reputation. From the results of 1974, it was felt that CMU's research component was not being duly publicized and so research material was added to the admissions literature.

Table 6

Mean Scores - 1974 vs. 1978

	1974		1978	
	Enrollees	Non-Enrollees	Enrollees	Non-Enrollees
Cost	2.5	2.4	2.8	2.8
Distance	4.0	3.6	3.8	3.0
General Reputation	4.8	4.2	4.8	4.4
Teaching Reputation	4.7	4.2	4.7	4.4
Research Reputation	4.3	4.0	4.6	4.3

A similar study was done on the university's non-applicants in 1978. Table 7 lists the results on a few factors. The perception of non-applicants on reputation factors were similar to that of the non-enrollees. Non-applicants had also rated extracurricular activities very low.

Table 7

Non-Applicants vs. Admitted Students
Mean Ratings

	Non-Applicants	Non-Enrollees	Enrollees
General Reputation	4.3	4.4	4.8
Teaching Reputation	4.2	4.4	4.7
Career Preparation	4.3	4.4	4.7
Student Housing	3.5	3.3	3.5
Extracurricular Activities	3.6	3.8	3.9

Last Spring CMU conducted a survey of graduating seniors to evaluate their achievements and perceptions. The responses of the Seniors and the admittees are compared in Table 8. The overall opinion on housing is low. The consistently negative response on campus appearance reinforces the need for improvement in that area. Intramurals received a high positive response from the Senior students. Similarly, social events off campus were highly favored by them.

Table 8

Seniors vs. Admittees
Percent Satisfied

Seniors[1]		Admittees[2]	
Instruction	81%	Teaching	88%
Dorm Life	56	Housing	42
Condition of Buildings	32	Attractive Campus	41
Intramurals	92	Athletic Life	43
Inter-collegiate	62		
Social Life on Campus	54	Social Life	54
Social Opport. in Pittsburgh Area	74		
Cultural Events Off Campus	88		

[1] 3 or 4 on a 4-point scale, where 4 is most satisfactory.

[2] 4 or 5 on a 5-point scale, where 5 is excellent.

Conclusion and Implications

The analysis has confirmed CMU's strong institutional position in the market. The institution's weaknesses have also been illustrated. These studies and comparisons are good feedback for the Admissions Office on its campaign efforts such as the positive change in research reputation as shown by the comparison of the 1974 and 1978 perception studies. The students on campus view favorably some of the characteristics like athletic and social life and this can be used to improve the perceptions of admittees on these factors. But the opinions of seniors on facilities and appearance are consistent with that of the admittees. One of the purposes of this research is to provide meaningful results to the decision-makers. The responses on cost and reputation reinforce that it is important to maintain the quality of the institution and to do so, that tuition can be raised. More research is called for regarding physical appearance to determine the specific improvements that would have the largest impacts (like sidewalks, lawns and building exteriors etc.). Periodic re-evaluation of academic programs are necessary to meet the needs and demands of the students. Some of the programs the non-applicants wanted were not available at CMU. On the other hand, some admittees enrolled elsewhere for better programs in the fields that CMU offers. Efforts are underway to weigh the trade-offs of addition or revision of the programs. Analysis by segments strongly suggest that marketing strategies must be sensitive to the needs of different consumers, to increase the overall institutional attractiveness.

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DETERMINING THE "IMPORTANCE" OF REASONS FOR CHOOSING INDIVIDUAL COLLEGES

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With the dreaded 1980's imminent, colleges are understandably uneasy. Enrollment projections for full-time equivalent students in higher education show a decrease of 20 to 30 percent for most regions of New York State by 1990.[1] The New York State Education Department has warned colleges and universities to expect a decline in the traditional college age students, a high rate of emigration from the state, and a deteriorating economic base for providing jobs, revenues, and state aid to education.

Faced with the shrinking economic and student pie, most institutions have turned to some type of planning in an attempt to offset this predicted decrease for their own colleges and universities. Planning strategies usually include the definition of mission statements, goals, and strategies for attaining these goals. Mission statements are important because successful competition for students depends on a school's ability to carve out a niche for itself in the large field of possible offerings of higher education and to project that special image to potential clientele.[2]

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[1] "Underserved Population Groups and Postsecondary Education: Future Enrollments and Student Access," The University of the State of New York, The State Education Department Office of Postsecondary Research, Information Systems and Institutional Aid, Albany, New York, August 1979, pp. 14-19.

[2] The importance of finding one's niche is based on the concept of institutional positioning in Douglas V. Leister, "Identifying Institutional Clientele: Applying Metamarketing in Higher Education Administration," *Journal of Higher Education*, XLVI (July-August 1975), 388.

Another term for image projection is marketing, a process gaining wider acceptance by the educational community, albeit reluctantly, William Ihlanfeldt identifies three basic components of the concept of marketing in higher education: research, strategy, and communication.[3] The research component involves finding the answers to two questions. First, why do potential candidates like or dislike an institution? Second, how do interested candidates go about making their choices of institutions?

Strategy is simply determining the best approach to the marketing effort, given both the data gathered during the research stage and an assessment of the institution's resources. The third phase, communication, has two aspects: internal and external. Internal communication is the effective transmittal of the needs of potential students (the marketplace) to the faculty, administrators, public relations officers, student affairs personnel, and admissions directors, who shape and project the college's image. External communication presents what the institution has to offer to its potential pool of students.

It is the internal communication aspect of the marketing process that is most often neglected in college marketing and is the problem addressed in this paper.

Siena College Freshman Survey

In 1977, the Admissions Office of Siena College began asking freshmen to identify the factors which were important in influencing their choice of Siena College. During the September orientation week, the freshmen were given a questionnaire (See Appendix A), whose first question asked them to rate eighteen factors as to whether they were VERY IMPORTANT, SOMEWHAT IMPORTANT, or NOT IMPORTANT in influencing their decision to come to Siena College. The eighteen factors were a mixture of items depicting the college's stated mission, the Admission's Office perception of the Siena image and various policies of the Siena recruitment effort.

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[3] William Ihlanfeldt, "A management Approach to the Buyer's Market," Liberal Education, LXI (May 1975), 133-148.

In analysing the results of the questionnaire, the responses were presented in terms of the relative frequency of the three importance responses to each item. In addition, the responses were reported according to the sex, residence, and academic division of the students. An excerpt from the report is reproduced below:

HOW IMPORTANT WAS EACH OF THE FOLLOWING FACTORS IN INFLUENCING YOUR DECISION TO CHOOSE SIENA COLLEGE?	VERY IMPORTANT			SOMEWHAT IMPORTANT			NOT IMPORTANT		
	T*	F	M	T	F	M	T	F	M
Liberal Arts Tradition	21	21	20	50	51	48	29	26	32
Albany Area Location	46	49	44	40	37	42	14	14	14
Campus Tour	22	31	14	41	39	43	37	30	43
Promotional Literature	19	24	16	55	55	55	26	21	29
Campus Interview	21	28	15	34	33	35	45	39	50

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*T = Total Freshmen
F = Female Freshmen
M = Male Freshmen

TABLE A

Information presented in this manner proved to be very confusing and somewhat misleading. When given to the members of the long-range planning committee, various members tried to interpret the results by comparing the percentages of the freshmen indicating VERY IMPORTANT for the eighteen items. Other committee members compared the NOT IMPORTANT percentages. On the whole, it was quite difficult to wade through all the numbers and to get the overall impression of the relative importance of the factors.

Comparing only the VERY IMPORTANT or the NOT IMPORTANT columns tended to be misleading if one were trying to rank the perceived importance of the various factors. For example, from the information in Table A, one would rank the

Albany area location first in importance, followed by campus tour, liberal arts tradition, campus interview, and promotional literature if the VERY IMPORTANT column were used. The NOT IMPORTANT column would give a different order: Albany area location, promotional literature, liberal arts tradition, campus tour and campus interview.

If the interpretation of data is confusing or misleading, administrators and faculty are not going to pay attention to the survey results or take them into account when formulating policies which could affect the college's image and have repercussions for attracting the type of student the college is trying to reach. In our case, the committee members left the meeting unsure of what we had learned from the questionnaire and perhaps a bit uneasy that some of their perceptions of Siena may not have been shared by the freshmen.

Importance Scale

What was needed was some way to summarize the students' opinions as to the importance of the various factors in choosing Siena college and which took into account all three importance responses to each item. The Office of Institutional Research and Planning proposed that the responses to each item be measured on a simple importance scale, where NOT IMPORTANT was assigned a value of "0"; SOMEWHAT IMPORTANT a value of "1"; and VERY IMPORTANT a value of "2".

The importance score for each item was computed by adding the values of the individual student responses for that item and then dividing by the total number of responses. In this way, each item's score would vary between 0 and 2. An importance score around "0" indicated that almost all of the freshmen felt that this item had little importance in their choice of Siena College. A score around "2" indicated that this item was very important for the students' decision. A score around "1" indicated that the freshmen had mixed feelings about this item.

A possible weakness of this scale is that a score of "1" could indicate that either most of the students had checked SOMEWHAT IMPORTANT as opposed to VERY or NOT IMPORTANT, or it could mean that the students were split between scoring the item as VERY IMPORTANT or NOT IMPORTANT. Either circumstance would yield the same overall importance score. One possible solution to the problem is the computation of importance scores for the students on the basis of their sex, residence status, and academic division. If there is a split among the students on an item, it should break out in one of the subgroups, i.e., the male freshmen felt that the item was very important, while the female students felt that the item was not important.

Scale Application

After assigning each item an importance score, it was then possible to rank the factors. We found that the following seven factors had scores over "1":

1. Academic Reputation	1.698
2. Size of College	1.603
3. Campus Appearance	1.346
4. Albany Area Location	1.326
5. Extra-curricular Activity	1.159
6. Cost	1.078
7. Financial Aid	1.014

TABLE B
1977 Top Importance Scores

Although none of the factors had scores near "2" indicating a consensus on what was very important in the choice of Siena College, it still is possible to pick out aspects of Siena's image which influence choice. Academic reputation (as defined by the student) and the size of the college had the greatest impact on the freshmen class of 1977. Policies resulting in the loss of quality programs or an increase in the small size of the college might have disastrous effects on recruitment efforts.

The appearance of the campus and the location of the college in the Albany area also had moderate influence. The college cannot change its location, but should be aware of the large number of commuter students its location attracts. The campus is well-landscaped and in an attractive suburban setting which creates a favorable impression when the campus is visited. This may indicate the importance of a policy of strongly encouraging campus visits for prospective students. The campus tour item received a score of .844, rather low on the scale. This may be explained by the fact that 40 percent of the freshmen were commuters and thus already familiar with campus from having grown up in the area. In fact, freshmen residents did rate the tour higher than the commuters.

Extracurricular activities, cost and financial aid were only somewhat important to the group as a whole. These items, as well as the others, require further analysis before interpreting their relative importance for Siena's ability to attract the particular type of student it desires.

The use of the importance scores made further analysis easier. Since the importance score for each item was really the average score of the students' responses, a t-test was used to determine whether the difference between the scores of the categories of the three groupings according to sex, residence and academic division were statistically significant at the .01 level. It was important for the college to have some certainty as to actual differences in perceptions, as the college was attempting to set policies for a desired sex ratio among the students, for attracting commuter students to ease a campus housing crunch, and for a desired balance among the three academic divisions.

The importance scale did point out some significant differences. Many of them were not unexpected, such as the commuters considering the location of the college of prime importance, while the residents were much more influenced by the size of the college. However, now these intuitive feelings were documented.

The school realized that the results of one survey were not enough to provide the basis for decision-making and is now in its third year of surveying the freshmen. (See Appendices B and C.) The results of the second survey by and large supported the results of the first survey. Again, t-tests were used to determine significant differences between the 1977 and 1978 scores for each item. The major deviation in the 1978 scores was in the perception of the importance of financial aid for the students from the three academic divisions. Financial Aid policy had changed during the spring of 1978 and the questionnaire and scaling system had been able to measure its effects. The administrators were delighted with the scale's sensitivity to the policy change, and the whole operation of surveying the students and reporting the results in terms of importance scores gained validity in their eyes.

Conclusion

Marketing will gain greater acceptance as colleges and universities compete over the shrinking pool of high school graduates over the next two decades. An important component of marketing is communication - both the external communication of the college's uniqueness to potential students and the internal communication which feeds back the students' perceptions of the college to people in positions to make and project policies affecting the college's image.

Very often, communication to college policy-makers breaks down because of the methods in which the information is displayed. The simpler and more concise method is the better one, especially for administrators and faculty not trained in and wary of statistics. If the information is easily interpretable, it is more likely to be used and the research departments of the college or university become more central to the decision-making and planning processes.

APPENDIX A

FALL 1977 ADMISSIONS OFFICE SURVEY OF ENTERING FRESHMEN

PLEASE INDICATE:
Male _____ Female _____
Resident _____ Commuter _____ Division: Arts ____ Business ____ Science

I. HOW IMPORTANT WAS EACH OF THE FOLLOWING FACTORS IN INFLUENCING YOUR DECISION TO CHOOSE SIENA COLLEGE? (MARK ONE IN EACH ROW)

	Very Important	Somewhat Important	Not Important
1. Siena's liberal arts tradition			
2. Catholic College			
3. Geographic location (Albany Area)			
4. Cost			
5. Business program			
6. Science program			
7. Financial Aid			
8. Presence of Franciscan faculty			
9. Academic reputation			
10. Campus tour			
11. On-campus interview			
12. Promotional literature received from the college			
13. Parental influence			
14. Friends presently attending			
15. Basketball program			
16. Campus appearance			
17. Size of the college			
18. Extra-curricular program			

II. HOW MUCH IMPORTANCE DO YOU PLACE ON EACH OF THE ITEMS LISTED BELOW IN RELATION TO YOUR UNDERGRADUATE EXPERIENCE? (MARK ONE IN EACH ROW)

	Very Important	Somewhat Important	Not Important
1. Academic advising			
2. Career and vocational counseling			
3. Job placement assistance			
4. Professional school or graduate school counseling			
5. Spiritual counseling and advising			
6. Personal and social counseling			
7. Remedial assistance			
8. Internship opportunities			
9. Academic honors program			
10. Independent study options			
11. Opportunity to meet informally with faculty			
12. Small classes			

III. TO WHAT OTHER COLLEGES WERE YOU OFFERED ADMISSION?

APPENDIX B

FALL 1978 ADMISSIONS OFFICE SURVEY OF ENTERING FRESHMEN

PLEASE INDICATE:

Male _______ Female _____ Division: Arts ____ Business ____ Science _____
Resident _____ Commuter _____

I. HOW IMPORTANT WAS EACH OF THE FOLLOWING FACTORS IN INFLUENCING YOUR DECISION TO CHOOSE SIENA COLLEGE? (MARK ONE IN EACH ROW)

	Very Important	Somewhat Important	Not Important
1. Siena's liberal arts tradition			
2. Catholic College			
3. Geographic location (Albany Area)..................			
4. Cost			
5. Business program..............................			
6. Science program			
7. Financial Aid			
8. Presence of Franciscan faculty			
9. Academic reputation			
10. Campus tour			
11. On-campus interview			
12. Promotional literature received from the college ..			
13. Parental influence			
14. Friends presently attending			
15. Alumnus/a contact			
16. High School counselor's recommendation			
17. Basketball program			
18. Campus appearance			
19. Size of the college			
20. Extra-curricular program			

II. IN CHOOSING A COLLEGE, WAS SIENA YOUR FIRST CHOICE? Yes _____ No _____

III. IF NOT, WHICH COLLEGE WAS YOUR FIRST CHOICE? ________________________________

IV. PLEASE LIST THE OTHER COLLEGES WHICH OFFERED YOU ADMISSION AND RANK THEM ACCORDING TO YOUR PREFERENCE. (USE 1 TO INDICATE YOUR HIGHEST PREFERENCE.)

________________________________ ________________________________

________________________________ ________________________________

________________________________ ________________________________

APPENDIX C

FALL 1979 ADMISSIONS OFFICE SURVEY OF ENTERING FRESHMEN

PLEASE INDICATE:

Male ____ Female ____
Resident ____ Commuter ____ Division: Arts ___ Business ___ Science ___

I. HOW IMPORTANT WAS EACH OF THE FOLLOWING FACTORS IN INFLUENCING YOUR DECISION TO CHOOSE SIENA COLLEGE? (MARK ONE IN EACH ROW)

	Very Important	Somewhat Important	Not Important
1. Siena's liberal arts tradition			
2. Catholic college			
3. Geographic location (Albany area)			
4. Cost			
5. Business program			
6. Science program			
7. Financial Aid			
8. Presence of Franciscan faculty			
9. Academic reputation			
10. Campus tour			
11. On-campus interview			
12. Promotional literature received from the college			
13. Parental influence			
14. Friends presently attending			
15. Alumnus/a contact			
16. High School counselor's recommendation ..			
17. Basketball program			
18. Campus appearance			
19. Size of the college			
20. Extra-curricular program			
21. Community atmosphere			

II. IN CHOOSING A COLLEGE, WAS SIENA YOUR FIRST CHOICE? Yes ____ No ____

III. IF NOT, WHICH COLLEGE WAS YOUR FIRST CHOICE? ______________________________

WOULD YOU PLEASE MENTION ANY OTHER FACTORS INFLUENCING YOUR CHOICE OF SIENA COLLEGE?

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____

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8/79

Information Systems in Enrollment Management

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To further discuss the probably malevolent impact of the birth decline on America's independent colleges and universities or the effects of the harsh inflation still to come upon their tuition levels seems heartless, if not, in fact, cliche. To incorporate the relevances of Management Information Systems into this already familiar discussion would likely do no more than render things difficult to take, if not downright unbearable. No self-respecting college administrator would plead ignorance on the former subject and not even the most sheepishly modest manager would not claim at least a general knowledge of the latter. In any case, should we waste any more breath or wood pulp on such prosaic topics. We are, however, still troubled as we doze off at the latest conference on declining college enrollments or grate at the often diffused commiserations of the attendees at the annual professional get-togethers. We all know that there are problems facing our institutions but we don't all know what to do about them. Some of us "know about" what to do but not "what to do". Of course there are those, seemingly "in the know", who play a variation on what is often purported to be the game of modern medicine: rather than identifying the symptoms of a physical disease and treating them (instead of truly curing the patient), they take a step further away by identifying the symptoms of institutional health and ostensibly producing those symptoms. This is most often done by constructing a report that will be the envy of one's extra-institutional colleagues, which report (1) aggregates source data,which is the result of some astute back-pedaling, (2) is conceived

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in isolation from the managerial decision-making process, and, (3) does not arise as a planned by-product of the operational processes of the institution. So, the point is not "knowing about" what to do in order to cultivate the holding of one's own at some round table discussion but first, really "knowing", secondly, "knowing how", and thirdly, the practical application of the theory and technique or, simply, "doing it". Once the theory is well-marketed within the institution, as well as thoroughly understood by those who are to implement the system, it is, as in any team sport, a matter of "execution".

At this point, it is proper that we set down the specific focus of this essay. It is not directed to the institution that is likely to cease operations in the coming decade. The techniques available for such applications as institutional phase-out, or even for determining the likelihood of such an event, have no bearing here. Our point of departure assumes that the administration of the college or university in question has carefully arrived at the perception and belief that its institution will, given proper direction, survive the remaining years of the twentieth century. An assumption implicit in the above is that the staff of that institution possesses sufficient talent to "carry it off". In other words, this essay will not attempt to set down the imaginary processes whereby one can substitute some "cookbook" system for talent. It will, however, touch upon the function and organization of that talent or possibly base some criteria which might serve to screen for such talent. So, at best, we are talking about the healthy institution, at worst, about the moderately diseased but viable one.

It is axiomatic that, given a group of people bound together by agreement to a broad purpose, and sufficiently skilled to carry out that purpose, if a problem exists, it is most probably one of communication. A further axiom is that function determines structure and that structure monitors function. For example, if we propose to start a medical college, the purpose of our institution will be to produce competent physicians, and, toward that end, must perform certain functions. In order to facilitate these functions, a bureaucratic structure must be instituted which will monitor these processes designed to effect the originally stated objective. Note, however, that should bureaucracy take it upon itself to essentially change those functions to suit its own regulative efficacy, then the original objectives would cease to be served. So, here we will discuss communication, purposes, function and structure. We do not propose to "prove" whether function precedes structure, or vice versa, or whether one needs an information system in order to determine whether there should be an information system. Such questions of "chicken and egg", "causeless cause" and "unmoved mover" are not germane to this discussion. We do, however, propose to drive home the point that the Management Information System should be designed after the structure and function of the organization itself (given that the organizational setup is considered to be satisfactory). Conversely, the MIS should not be used to covertly re-structure the organization to its own technical or bureaucratic purposes or simply support those institutional functions which its developers deem technically expedient.

Here, we must take a definitional digression to make the proper distinction between "structure" and "system". "The distinction is similar to that between anatomy and physiology. Anatomy deals with structure - what it is, whereas physiology deals with process - how it functions." (Anthony, p.5) Most definitions of "system" are, however, misleading, or at best, incomplete. For example, Webster's Unabridged Dictionary defines it as: "A complex unit formed of many often diverse parts subject to a common plan or serving a common purpose". But then a skyscraper would satisfy that definition. Therefore, what Webster's calls "system", we choose to call "structure". If you begin with a collection of often diverse objects, you have a "set". Adding "subject to a common purpose" yields a "structure". To achieve the dynamic correlate of "structure", or "system", you need movement, flow and transformation. Structure is static; system, dynamic. Of course these distinctions are conceptual and not in the experience of the organization itself, but they are, nevertheless, useful.

So, the assumption is that the institution has already evolved an administrative structure which supports its basic functional purpose. In this instance, one of the organization's functional subsystems would be Enrollment Management, which is a process "...bring(ing) together the often disparate functions having to do with recruiting, funding, tracking, retaining and replacing students as they move toward, within and away from the University". (Maguire, p.1) To facilitate this process requires an information system, or better, a "planning and control system" (Anthony). This system, which would, in fact, be only part of the university's total MIS, would help to give life and communication to the conceived processes and would further the informational facility for planning, predicting and controlling enrollments while assisting in the establishment of measures of institutional quality and not, of itself, transforming institutional purposes.

A useful framework for mapping this process into formal informational terms within any administered organization would be tri-leveled as follows: strategic planning, management control and operational control.

Strategic planning "...is identified by terms such as policy formulation, goal setting, and top management planning" (Anthony, p.15) and would be strictly defined as '...the process of deciding on objectives of the organization, or changes in those objectives and on the policies that are to govern the acquisition, use and disposition of ... resources'. (Anthony, p.16) In terms of Enrollment Management, strategy implies planning such things as overall enrollment levels, formulating broad marketing policies, the building of a dormitory, the acquisition of a new campus, etc. To perform these functions or to decide whether to perform them requires information. That decisional information's source is, in some measure, extra-institutional, but also requires a workable, internal information system.

At a middle level, and associated with the ongoing administration of the enterprise is "management control", defined as '...the process by which managers assure that resources are obtained and used effectively in the accomplishment of the organization's objectives' (Anthony, p.17). Managerial control for enrollment means setting staff levels, determining travel policies, designing admissions literature, redesigning financial aid packaging strategies, monitoring enrollment levels vis a vis the admissions decisional processes, formulating research projects which will assist in revealing student attitudes, making overall enrollment projections, monitoring student exits and reentrances, etc.

Lastly, is the category of "operational control", distinguished from the previous level in that it relates to the performance of specific tasks, and the process of assuring that those tasks are carried out effectively and efficiently (Anthony, p.18). Given our present focus, the aspect of operational control would include processing and monitoring admissions inquiries, applications, acceptances, deposits, etc.,monitoring financial aid expenditures, processing grades, transcripts, tracking enrollments, clearing students for graduation, processing student exit and reentries, etc.

So, it is of crucial importance that some rather specific information needs be agreed upon before anything else happens. This would require some protracted meetings between the management of the MIS function and those directly responsible for the Enrollment Management function. Also in order would be firm communications among both parties and the institution's top management regarding system development priorities as well as the upper eschelon's needs for information to support strategic decisions concerning the enrollment, and other related areas. The common errors at this stage are as follows: (1) failure to enlist the understanding and support of top management in the development, (2) failure to specify managerial control and strategic information needs before deciding upon and/or implementing operational/transactional functions (the point being that often a system will be designed to process transactions and produce lists, failing to provide for the collection of information in a form which will lend itself to higher level report formats or subsequent research demands), (3) failure to specify the broad data and information flows required to ground a successful systems effort, realizing that the administrative structure does not always (in fact, rarely) perfectly fit these requirements (to say another way, you must enlist the cooperation of key administrators, some of whom are not directly involved in the Enrollment Management effort but who are informationally involved in the very success of that effort), and, (4) failure to involve key support staff in the design of the system, as it is only intelligent to enlist the good sense, expertise and support of those who will make or break the transactional system, which is the foundation upon which everything else is built.

Now, we are not so naive as to imagine that you will sit back in a vacuum, with no present information system. and dream fond dreams. We do mean, however, that you not allow tactical problems to enter into the beginning discussions on system objectives and information needs. These essentials must have clear definition from the outset. In the feasibility stage, it can be decided, at least in a preliminary fashion, how certain technical/financial considerations might impinge upon these "essences". The user should be ready and willing to compromise on the "accidents" but not on the "substance". In other words, you cannot let the budget people or the MIS-types defeat your project by allowing your essential objectives and information needs to be watered-down because of any seemingly crucial (but, in fact, arbitrary) economic/technical biases. Certainly, you cannot live totally outside of such considerations as money, available technical expertise, the state of the systems art, hardware and software considerations, etc. You must, however, understand what IS essential and that, if alterations are to be made, it is no secret to be discovered or revealed months or years later, when it is all but too late to recover.

Next, you must realize that you cannot have everything "NOW", something of which the MIS people will be quick to remind you. This point in the discussions is often the most taxing for the user management (in this case, the enrollment managers) because it is precisely where the technical people will surface their most arcane vocabulary, arranged in sentences which torture the user's sensibilities, carefully designed to "boggle their minds". In fact, talking from just such a personal experience, some pundit observed that these "computer types" were the post-modern correlate of the aboriginal shamans. Personally, we think that a healthy "adversary" relationship between the users and the MIS staff will, in fact, benefit the organization, if both sides well understand the overall objectives. Nevertheless, you will be introduced to the terms "modular" and "integrated", among others. These words may be used to justify the most outrageous surgery (and/or delays) on your most highly prized ideas. It will benefit you, however, to "come to terms" with such terms. You cannot, as previously noted, have everything "today" but all of the pieces (modules) should fit together and work together (integrate) as they are installed. You cannot, in addition, forever avoid the fact that some member(s) of the user group must be "in the technical know". Someone must understand the order of development, both horizontally (through each office or enrollment management function) and vertically (within each office or, better, logical subsystem). Remember, the systems development timetable will effect your decision making as the various modules are installed within each organizational area and, in steps, from one institutional area to another. For example, we might welcome the installment of the data collection modules for the admissions subsystem, along with some simple roster reports, knowing that some more sophisticated reports might have to wait until some further development has been done on the financial aid or student record subsystems. In the absence of these computer reports, we might have to do with a manual substitute or simply rely on some approximate data, coupled with our seasoned intuition. Tangentially, may we note that this "seasoned intuition" should never, never be abandoned. In fact, many computer reports, when actually studied, not only support present-time decisions but also further refine our crucial human understanding of the problem. A case in point would be the subject of student attitudes: we should not take a "shoot from the hip" approach to possible policy changes based on our perceptions of student attitudes in the absence of any "hard research" or MIS data; neither should we study the problem forever, never taking appropriate action (an exaggeration of the management science approach). We should cost effectively collect and study some good information and make an "informed" decision, based upon our refined intuition.

Here we can make the point that, crucial to the success of the Enrollment Management project is an intelligent research program. Certainly, research objectives belong in any institutional discussion of information systems. We, in the university, are fortunate to have the faculty and student resources to call us to, and assist us in, the performance of some extremely important research. At the same time, the enrollment manager's research must form the basis for practical decision making and not take the common academic tack of "purity". Oddly enough, many often relegate such research to a lesser position, somehow below, and unrelated to, MIS. To this approach we must award a resounding disagreement. If research programs for Enrollment Management are conceived in isolation from basic systems planning (or not conceived at all), they are doomed, if not to failure, certainly to the fate of having to surmount tremendous barriers of information scarcity. One cannot execute decent research if the operational data bases are not designed with research ends in mind or if personnel are not accorded to the task because research is thought to be simply icing, rather than an essential part of the pastry.

Of course, we cannot, to the great relief of the systems developers, spend all of our time discussing true "information". Usually, the technical types fall in love with transaction processing at the expense of the MIS proper. They will welcome the time when the discussion to such topics as operations and transactions. Simply put, this is how all of the raw data will be captured, in what form, by whom, when, where, and why. Parenthetically, you should always have these six primordial questions ready at hand to act as a checklist whenever you are doing any planning. While you may not have heavily involved your support staffs in earlier phases of the discussions, now is the time... Your interest here should be to design a data capturing (processing) system which will insure the accuracy and integrity of the information at every reporting level (operational, managerial and strategic). Further, the methodology should also be considered in the light of your organizational substructures, e.g. - the staff organization of the registrar should conceptually interact with data flow considerations at this design phase. In fact, some modifications might be sought in the organizational pattern at a time when change is possible and even desirable.

Turning to the Enrollment Management information cycle, let us reveal our present bias toward on-line systems. First, some definitions are in order. Generally speaking, "on-line" means that someone is sitting at a computer terminal, most likely a CRT, entering data. Most users don't always have a concept of what happens next, save that somehow the data is organized and appears in detail and aggregate form on reports. For the sake of fostering a greater understanding, let us further divide "on-line" into (1) on-line information display, where we only look at information in our files, (2) on-line data collection, where we are collecting information in intermediate files for later application to the master files, and, (3) on-line update, where the transactions apply the data directly to the master files. Each of these would be proper in slightly different contexts. For example, during grade processing, it might be more desirable and efficient to use a data collection approach, followed by a mass application of grade data to the master files, whereas student exit information could be entered via a direct update approach. In any event, it is our feeling that this general "on-line" philosophy produces some distinct advantages. First of all, we must remind ourselves that our final reports are no better than what is potentially contained in the original source data (it could be worse if the report design itself is found wanting). Further, the integrity of the source data can best be insured by distributing its system entry to those members of the staff who best understand the meaning of, and have the direct responsibility for, that data. A batch approach would involve too much data flowing through a single conduit (viz. - a keyboard specialist). This philosophy would not have the advantage of "understanding at the source", it would put another pair of hands into the process, allowing for more error, backlogs could arise which would slow the reception of the reports based upon the specific data in question, error lists would have to be produced and processed, and, most important, much data might not be as easily captured as with the on-line approach.

Taking this viewpoint into a discussion of the Enrollment Management information cycle will illustrate the value of the on-line bias. In our opinion, the information story begins before the preliminary application stage. It is our preference, made possible by the on-line technology, to begin with telephone or written inquiries. When a prospective applicant makes his or her first contact with the admissions office, someone sitting at a T.V. terminal is initializing a computer record for that person by virtue of entering their name, address, etc. Given the proper record identification strategy, this person's admissions (and, if accepted, matriculated, etc.), registration, alumni information can be connected to provide aggregate activity reports to assist us in coming to an understanding of the efficacy of admissions efforts, student withdrawal behavior, graduation success rates, placement strategies, etc. Naturally, we are not concerned with establishing dossiers on our students and are acutely aware of the rights of privacy of the people behind this information. We do beleive, however, that this kind of data collection strategy will benefit both the present and prospective students, as well as the university, by providing a foundation for research and decision support systems which will insure the survival of our community and enhance the quality of academic life.

Before summarizing our position on MIS for Enrollment Management applications, let us make the important point that while the computer is part of the reality of present-day MIS and, further, that it has enhanced the decision makers position not only on a quantitative level but on a qualitative one, it (the machine) is not a logical necessity in order to have an information system. And, in fact, we continue to believe in the manual collection of information: every day, admissions application numbers are entered into a ledger book; every day student withdrawal numbers are similarly recorded. This has several advantages: if the computer system fails, we still have this crucial information at our fingertips; it provides a check against computer reports, which is especially helpful during the early stages of systems implementation; most of all, this manual system, along with the activity of comparing it to the automated one, causes us to think when we read reports. Questioning what appears to be unquestionable, paradoxes, information anomalies and "wrinkles" has provided us not only with an intimate knowledge of the workings of the systems but also has yielded us some of our greatest insights, setting the tone for many crucial decision situations and research projects.

In review, we posit that you should:

1. Get your definitions straight as a first step: both general MIS nomenclature and your own Enrollment Management terms for your institutions (such as "withdrawal", "student", "bed", etc.)
2. Establish the objectives of the Enrollment Management effort as well as its information support systems and information cycle.
3. Begin with some report design on each of the three information levels.
4. Next determine the data which must be collected to make these reports a reality.
5. Then move to the capturing strategies which will "file" this data.
6. Involve all levels of the organization in the design and implementation efforts.
7. Develop a vigorous, practical research program.
8. Remember that there is no substitute for a job well done.

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The Admissions Rating Process and a Market Segmentation Analysis of Applicant "Quality"

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INTRODUCTION: Admissions people often have reason to ponder about why many of the most pressing problems of the university seem to be placed on their shoulders. Ongoing controversies over discrimination and questions about student competency reach to the core of our educational system. These concerns have raised everyone's awareness of the intricacies and the importance of Admissions policy. Now, with a projected decline in the number of college going 17-18 year olds over the next 15 years, another serious problem focuses attention on Admissions. For many in higher education, the fear is not just that the overall pool will be smaller, but that institutions will have to lower their Admissions criteria and that the educational experience at many institutions will be devalued. It will be a challenge during this period of retrenchment, for higher education to maintain professional standards of fairness and quality.

The goal of Admissions should be to attract and enroll those students which maximize the quality of the educational experience at that institution. It is an integral step towards this goal for an institution to develop its own definition of the "quality" of an applicant. This definition will vary slightly reflecting differences among institutions. Each institution should clarify its mission and seek to match what it has to offer with those students it can serve best.

For Admissions procedures to be an objective implementation of the goals of an institution and to insure fairness of treatment to applicants, it is desirable to systematize, to an extent, the rating process. A summary, numerical index of "quality" is very useful because it opens the whole operation for self-study. If the resultant index can be shown to be a valid representation of the different characteristics and needs of applicants, it becomes feasible through segmentation analysis to improve one's treatment of various applicant subgroups.

THE ADMISSIONS RATING PROCEDURE: At Boston College all decisions on applicants hinge on the Admissions Rating Procedure. The Admissions Rating is a number assigned by a staff member responsible for evaluating an applicant. The ratings range on a scale from 1 to 10 (with 1 being the highest). Staff members, given 100 applications, are to distribute ratings to average over a cycle as follows:

Rating	Frequency
1	1
2	4
3	10
4	10
5	10
6	15
7	15
8	10
9	15
10	10
	100

Table I

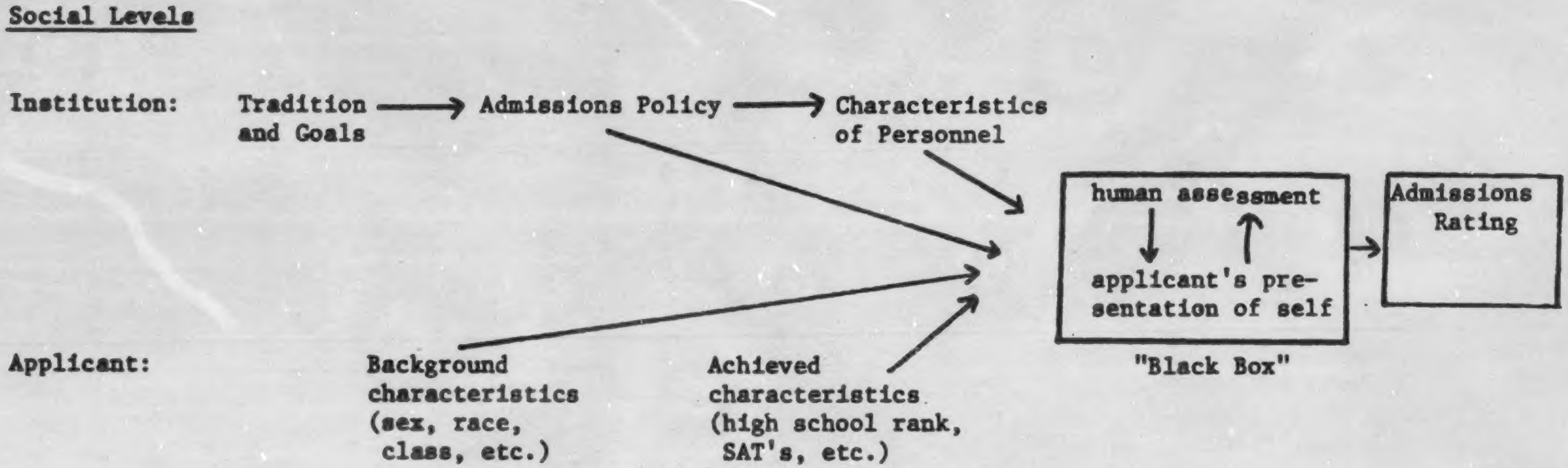
Within this major constraint, which eliminates variability in rater's tendencies to weight the high, middle or low end of the scale, primary emphasis is placed on percentile rank in high school. This emphasis was established and continues as this criteria is found to most consistently predict college performance and success at Boston College. SAT scores, recommendations, examples of writing, etc. are ordinarily considered at the next level. This gives the rater leeway to move an applicant up or down in rank. However, note that within the first major constraint, when one applicant is moved up, another must be moved down to maintain the same average distribution. This control over consistency is necessary because of the very real importance the Admissions Rating has for whether an individual is admitted, granted housing, offered financial aid, etc. or is not.

Optimally, the decisions which allocate scarce resources are made to be congruent with the aims of Boston College to bring in the "best" class. "Quality" then is a relative concept which takes on meaning operationally from institutional policy. Yet the rating process is not mechanical. Each rating represents a personal judgment at the end of an involved process. Figure 1 represents schematically this complexity.

Because the assessment of an applicant is admittedly a bit mysterious, a "black box" is used to signify the thought process which mediates between the characteristics of institution and applicant and the Admissions Rating. The point is, an Admissions Rating is not and should not be a summary of an applicant's characteristics. It should be a personal judgment about how each applicant may improve the educational environment of Boston College's academic community. Although each rating is in the end

Figure I

A Model of the Rating Process


Social Levels
Institution:
Tradition and Goals
Admissions Policy
Characteristics of Personnel
human assessment
applicant's presentation of self
"Black Box"
Admissions Rating
Applicant:
Background characteristics (sex, race, class, etc.)
Achieved characteristics (high school rank, SAT's, etc.)

subjective, the comparative significance of applicant characteristics may be objectively measured for the full distribution of Admissions Ratings.

DATA SOURCES: The sample is made up of over 2400 applicants accepted to enroll in Fall of 1978 who returned an Admissions Questionnaire mailed out the preceeding summer. Information from the Questionnaire was merged with data from applicant files.

METHODOLOGY: The sample will be divided up into 10 subgroups or segments which correspond to each Admissions Rating. The segments will be profiled using the major achieved characteristics considered when rating the applicant. Each quality segment will be further broken down into matriculant and non-matriculant subgroups to facilitate comparisons. A path model will be estimated to measure how selected achieved and background characteristics contribute to Admissions Rating. Finally, a few graphs will illustrate the forms of relationships between quality segments and their evaluations of various attributes of the university.

RESULTS AND CONCLUSIONS: Quality segments are profiled in Table II using three achieved characteristics of accepted applicants. The mean high school percentile and average SAT verbal and math scores are presented in the body of the table. The most notable conclusion is that Admission Rating successfully segments accepted applicants. The better the quality according to Admissions Rating, the higher the average achievements of segments. The range and consistancy of this pattern validates the usefulness of this segmentation for differentiating among accepted applicants.

Since the first level selection criteria is high school percentile, it is no surprise that one finds a strong, positive association with

Table II

Achieved Characteristics of Accepted Applicants by Admissions Rating of Quality-Class of 1982[1]

Admissions Rating	High School Percentile		SAT Verbal		SAT Math		N		Yield
	m[2]	n[2]	m	n	m	n	m	n	
1	1.54	1.47	604	626	633	677	16	34	32%
2	3.17	2.17	575	597	601	636	115	153	43%
3	5.16	4.88	538	557	571	605	268	303	47%
4	9.76	8.46	506	542	551	581	310	301	51%
5	15.20	12.94	510	520	556	565	203	187	52%
6	19.75	20.87	488	498	519	531	183	143	56%
7	28.67	26.38	458	477	498	523	102	46	69%
8	35.47	34.11	427	442	481	479	28	15	65%
9	48.84	-	400	-	420	-	16	-	100%
10	65.17	-	418	-	466	-	5	-	100%

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[1] For accepted applicants who returned the 1978 Admissions Questionnaire.

[2] m = matriculants; n = non-matriculants.

Admissions Rating. The individual level correlation is .68. This is a high correlation, but still leaves over 50% of the variance unexplained. The two other measured achieved characteristics, verbal and math SAT scores, also correlate well with Admissions Rating. These two variables add about 10% to the variance explained in Admissions Rating. The balance of the unexplained variance, around 40%, must be accounted for by other unmeasured variables (samples of writing, evaluation in interview, etc.) and variability in human judgment (i.e. the discretion of Admissions staff).

A comparison of means between matriculants and non-matriculants within rating segments helps to identify the effects of college choice on the composition of the Class of 1982. On all three achieved characteristics, non-matriculants scored higher than matriculants in each of the top five quality segments. This reflects the results of competition between Boston College and its prestigious competitors. In the high school percentile profile, differences between matriculants and non-matriculants are relatively small. This is because Boston College as a matter of policy awards financial aid (up to full need) and housing based partially on Admissions Rating. And, since high school percentile correlates more highly with Admissions Rating, the smaller differences reflect the impact of these policies. Also, many competitors place more emphasis on SAT scores when setting policy and are able to draw away high scorers. However, the larger SAT differences may not indicate differential "quality," if high school percentile is a better measure of academic competence and motivation, as we maintain.

In the last column of Table 2, the Admissions yield for each quality segment has been calculated. This is a measure of how effectively Boston College has been able to attract accepted applicants. By monitoring these figures from year to year, one may measure changes in one's ability to attract the most qualified applicants.

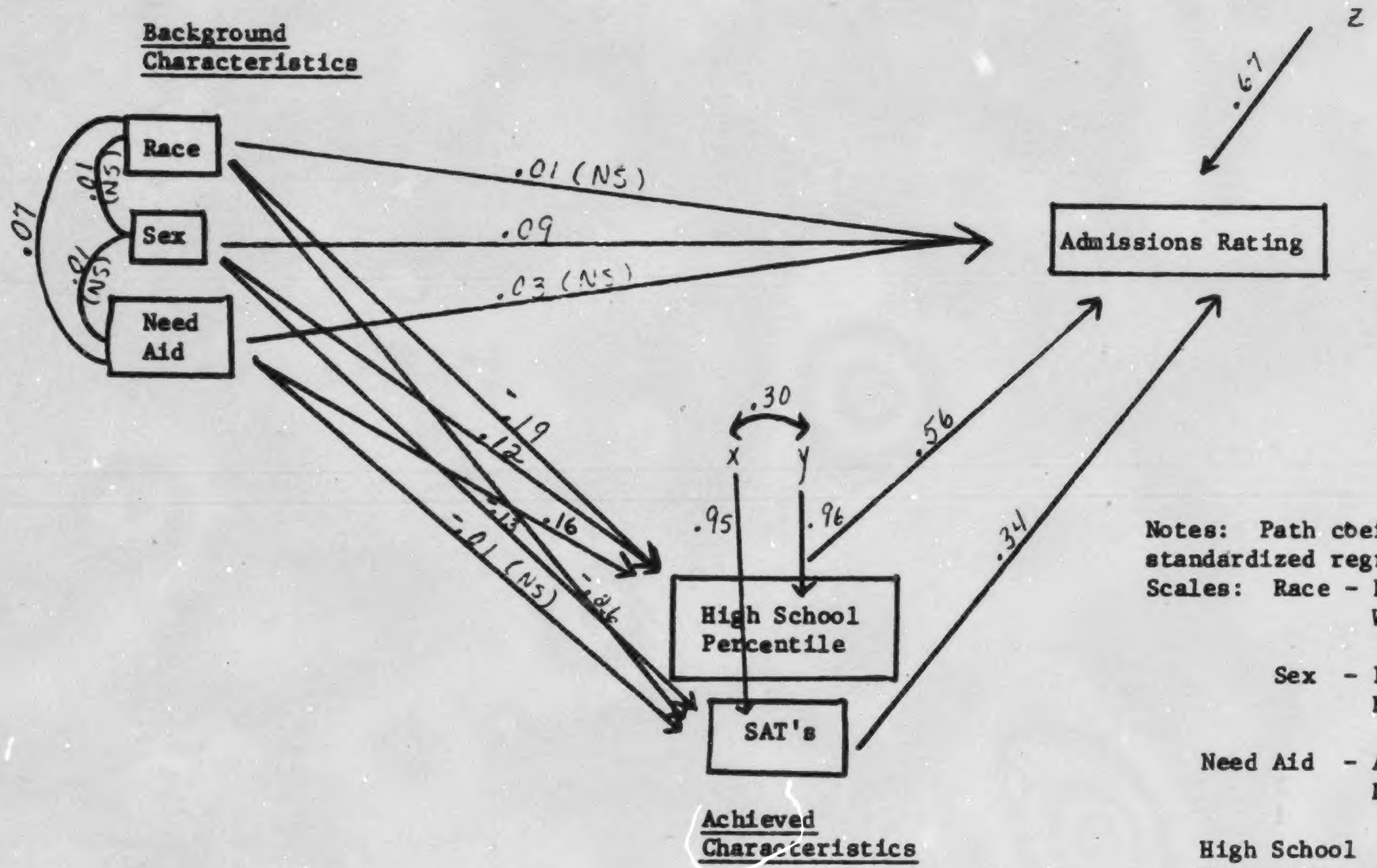
In the path diagram presented in Figure 2, it is possible to measure the contribution of high school percentile vs. SAT's while controlling for three background characteristics: race, sex, and financial need. With the largest path coefficient (.56), high school percentile makes the primary contribution. Yet clearly, SAT scores are also important (P = .34).

In contrast, background characteristics have little to do with Admissions Rating after controlling for high school percentile and SAT's. Race and financial need of applicants are insignificant. However, females do tend to be rated slightly higher even after controlling for achieved characteristics. It may be that females excel in other components such as in written expression, in the verbal interview or in high school activities. But this deserves further study. Interestingly, females are shown to do better on high school percentile but worse on SAT's (see path diagram). Without this balance, females might have a much greater advantage.

In Figures 3-5, examples of three patterns of perceptions are graphed. Figure 3 displays an inverse relationship between the quality of an applicant and the evaluation of the teaching reputation of the University. Said differently, the more qualified the applicant, the lower Boston College's teaching reputation is evaluated. Higher quality students are, after all, comparing Boston College to some very good colleges and universities. Other attributes which fit this pattern are: general reputation, specific academic programs, college faculty, research reputation, reputation of alumni, emphasis on graduate programs, religious opportunities, high school counselor's rating, and athletic programs. To maximize the quality of applicants, Boston College should adopt a differentiated policy towards quality segments with respect to these attributes.

Figure II

A Path Diagram of the Measured Contribution of Applicant Characteristics to the Admissions Rating of Quality



Notes: Path coefficients are standardized regression coefficients.

Scales: Race - Non-White=1
White =0

Sex - Female=1
Male =0

Need Aid - Applied for Aid=1
Did not =0

High School Percentile- 1 to 100, 100 is top.
SAT's - 400 to 1600, 1600 is top.
Admissions- Rating 1 to 10, 10 is top.

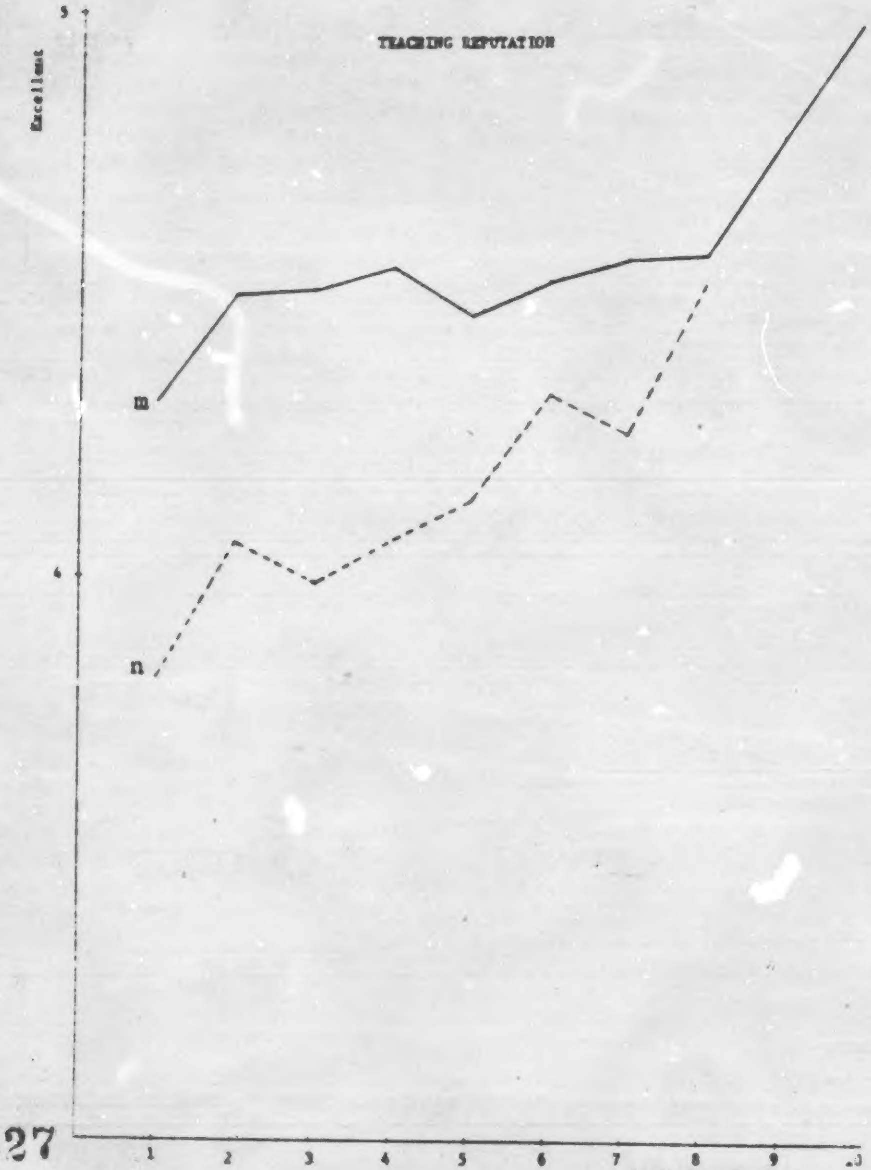


Figure 3

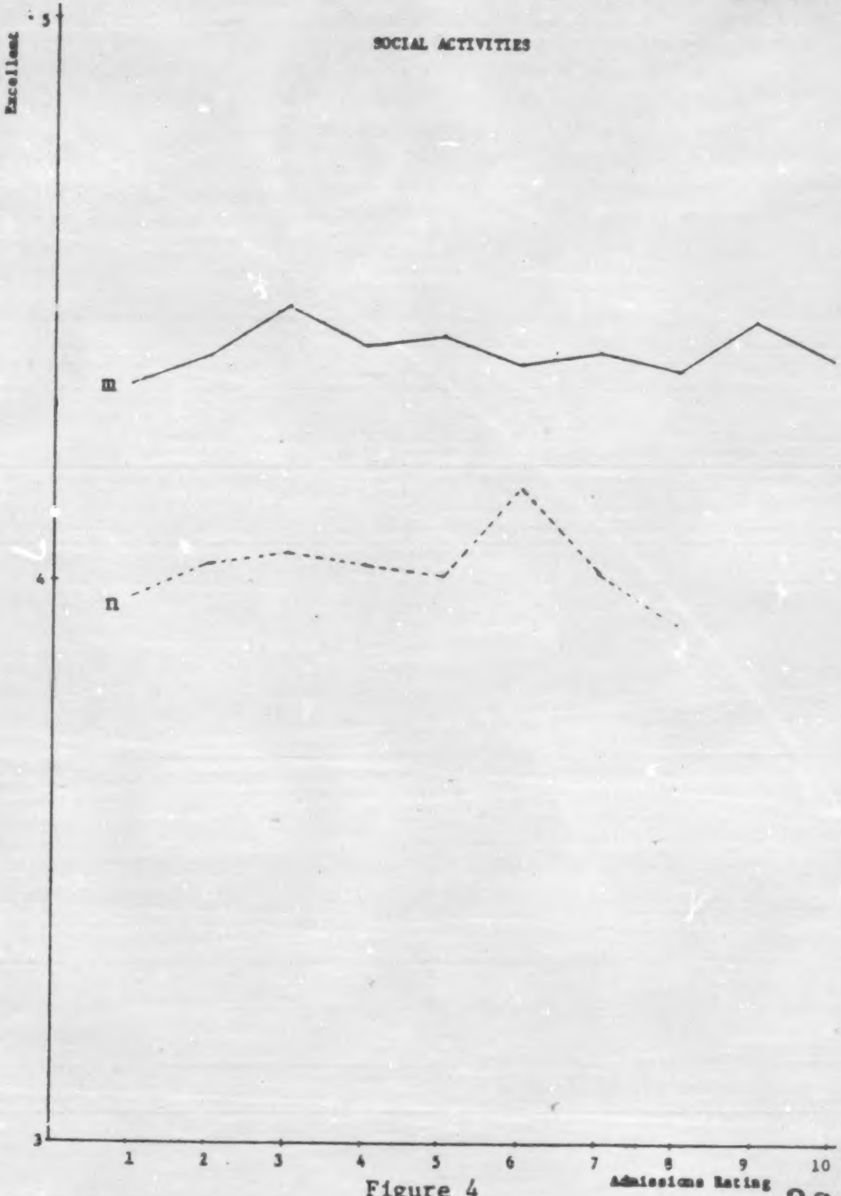


Figure 4

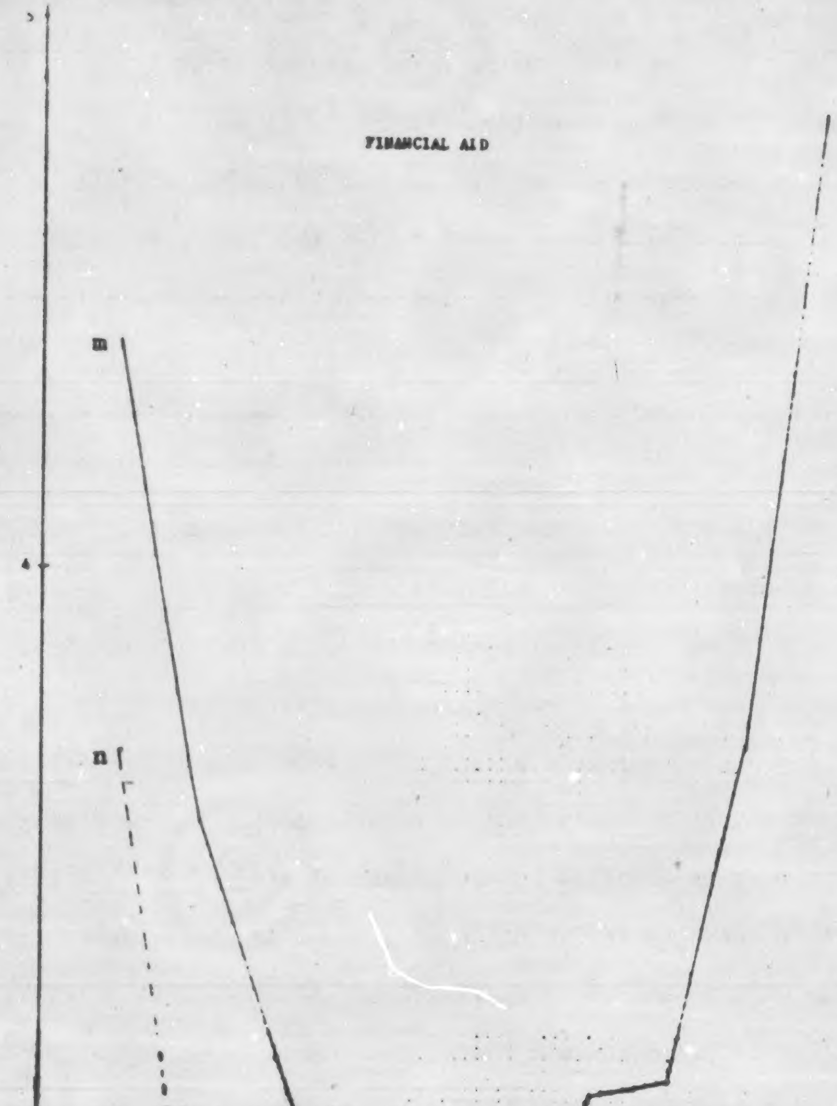


Figure 5

See Figure 4. Here the mean evaluations of social activities are graphed. This shows that there is little or no association between the quality of an applicant and perceptions of social activities at Boston College. Other attributes which follow the same pattern are: male/female ratio, size of school, variety of courses, Admissions literature, contact with Admissions personnel, and athletic facilities. There is little reason to vary one's treatment of quality segments with respect to these attributes.

In Figure 5, note that evaluations of financial aid are high at both extremes of quality, yet fall in a deep trough among the middle segments. This is a direct result of Boston College's aid policy. Ones are awarded aid up to need and twos and threes are offered substantial aid packages, and the lowest segments are on athletic or minority scholarships. The middle segments are only offered federal monies and self-help loans. Because cost is affected by the financial aid offer, this attribute follows this third pattern. And since the offer of resident status tends to be made on the same basis as financial aid, it too fits here. The pattern described by financial aid evaluations measures the effects of a differentiated policy towards quality segments.

IMPLICATIONS: The significant differences in evaluations across quality segments has validated the utility of Admissions Rating for segmenting the market of a university. The three patterns of relationships between quality and evaluations are of a general nature and are likely to be found to exist at many other institutions of higher education. Most importantly, this systematic approach opens up the Admissions process to self-study and facilitates planning to meet institutional goals for quality with objective fairness.

A Study of Dropouts and Persisters at Boston College

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Over the course of the previous decade, one topic which has received the "persistent" efforts of institutional researchers is retention. The result of such efforts should be information to guide institutions in finding the reasons students withdraw. Unfortunately, the results thus far have provided very few definitive answers to the question, "Why do students leave institutions in general and what, if anything, can be done to increase the liklihood of their retention?"

A review of current research, notably that compiled by Pantages and Creedon (1978), would provide most researchers with a study and findings replicating their own results. However, it is extremely likely that a similar study, resulting in contradictory findings, was cited in that same review. While research methodology can be debated, the most likely reason for such conflicting results is based on the differing nature of institutions. And the importance of conducting retention research at a given institution is one common theory espoused by all retention investigators.

Customarily, findings at one institution will have little, if any, validity at another school. Location, dormitory availability, male-female ratio, quality of the faculty and students, religious affiliation, social and cultural opportunities are just a few of the environmental factors encouraging a student to select or re-evaluate a given institution.

With this in mind, Boston College has undertaken studies to determine the reasons for withdrawal from the university. The most recent is an investigation of all student dropouts for the 1977-78 academic year with an accompanying study of a random group of sophomore and junior persisters. The survey was conducted during the summer of 1978 using the NCHEMS booklet, A Manual for Conducting Student Attrition Studies in Institutions of Postsecondary Education, with its accompanying questionnaire as a model.

The resulting Boston College Retention Questionnaire consisted of four parts: biographical characteristics, reasons for leaving, degree of satisfaction with the college and an assessment of student expectations vs. actual experience at the institution.

After one mailing and a follow-up to the group of 366 dropouts, 124 useable questionnaires were received for a response rate of 34 percent. The accompanying mailing to 300 persisters resulted in 96 useable questionnaires, a 32 percent response rate.

Using the Statistical Package for the Social Sciences (SPSS), the questionnaires were analyzed. The results provided the mean response for each variable with accompanying T-tests to determine statistically significant differences between the responses of the dropouts and persisters. Further breakdowns were also obtained for the following withdrawal subgroups:

Males and Females
Financial Aid and Non-Financial Aid Applicants
Residents and Commuters
GPA Above and Below 3.0
College of Enrollment

Selected results are shown in Tables I through III.

Findings

Demographic analysis of the dropouts and persisters indicated that persisters were more likely to possess the following characteristics: single, female, resident student, caucasian, enrolled in a professional school, graduated from a public or private rather than a parochial high school, reside in a medium-sized town, have a part-time job, a GPA above 3.0, a declared major and extracurriculars. Significant differences at the .01 level were found for two of these variables: GPA and extracurriculars. Results showed that persisters had accumulated average GPA's of 3.037 while dropouts averaged 2.8. Similarly, persisters were more involved in extracurriculars with an average of 2.29 activities compared with dropouts who participated in an average of 1.86 extracurriculars.

The final question in the demographic section required students to indicate the cost benefit of a Boston College education. Fifty percent of the persisters felt that it was worth the cost compared with 34 percent of the dropouts, resulting in significance at the .001 level. Despite the difference, these dropouts apparently did not leave for reasons of dissatisfaction with the institution. The remaining 66 percent who did not feel that BC was worth the cost have presumably provided us with their reasons in the following section.

Table I shows the responses given by students to the question, "Listed below are several reasons why a student might leave school. To what extent were these your reasons for leaving BC?" Contrary to expectation, the persisters ranked most variables higher than the dropouts. Upon further reflection it was hypothesized that

TABLE 1

MEAN RATINGS OF REASONS FOR LEAVING[1]

Reasons	Persisters N=85	Dropouts N=110	T-value of difference[2]
Academic:			
Low grades	1.88	1.60	1.87
Needed a temporary break from studies	2.02	1.55	3.05**[3]
Major or courses not available at BC	2.22	1.75	2.60**
Unsure of major	1.78	1.57	1.46
Unsure of career goals	2.02	1.78	1.53
Dissatisfaction with major department	2.30	1.76	3.27***
Lack of Motivation	1.74	1.75	-0.07
Employment:			
Conflict between job and studies	1.47	1.32	1.29
Went into military service	1.44	1.08	3.05**
Financial:			
Not enough money to go to school	2.67	1.92	4.20***
Personal:			
Found commuting too time-consuming	1.70	1.50	1.33
Illness, personal or family	1.87	1.56	1.56
Personal problems	1.98	2.02	-0.23
Marital situation changed my education plans	1.45	1.17	2.43*
Moved out of the area	1.32	1.20	1.06
Wished to attend school closer to home	1.57	1.54	0.19
University:			
Disliked BC's location	1.33	1.23	0.92
Housing problems	2.05	1.66	2.34*
Unable to get housing	2.04	1.41	3.78***
Lack of advising or counseling	2.02	1.81	1.31
Desired courses closed out	1.96	1.39	4.24***
Rejected for internal transfer	1.73	1.32	2.74**

[1] Scale: 4 = major reason 3 = moderate reason
2 = minor reason 1 = not a reason

[2] An approximation to the student's T is used which does not assume variances are equal

[3] * $p < .05$ ** $p < .01$ *** $p < .001$

the persisters were able to consider all types of reasons why they might leave while the dropouts could more easily focus in on their actual reason for withdrawal.

Therefore, the significant differences noted between the two groups reflect their differing perceptions. Persisters can only speculate possible reasons for withdrawal, and they apparently prefer to list socially acceptable reasons such as lack of money, housing difficulties or academic concerns. On the other hand, dropouts indicated their most important reason for withdrawal was personal problems. This same item was one of only two ranked lower by persisters. Apparently it is unlikely that students consider the likelihood of a personal problem but its occurrence can outweigh all other factors.

This, of course, does not diminish the importance of financial concerns which dropouts have ranked as their second most important reason for withdrawal. However, it does show how perceptions regarding possible reasons for withdrawal may differ from actual reasons.

When further breakdowns were performed for the same question, interesting differences emerged between the dropout subgroups. For example, when male and female reasons for leaving were compared, no significant differences were found between the two groups. It was a common hypothesis a decade ago that women were more likely to leave for marriage while men were often headed for the military. It was a pleasure to find that inequality is not statistically significant at Boston College!

Other subgroups examined included student applicants and non-applicants for financial aid. The greatest difference between these two groups was, not surprisingly, the variable not enough money ($p < .001$). Thus we see that for approximately half of the dropout group, financial aid applicants, monetary concerns are of the utmost importance while this issue is of minimal interest to those who do not apply for aid. This latter group indicated that they were more likely to leave because of housing problems ($p < .05$), perhaps sending us a signal that they were accustomed to better accommodations elsewhere!

Boston College has only recently transformed itself from a commuter institution, servicing students of the greater Boston area, to a nationally-known institution with an expanding array of on campus housing accommodations offered to a greater geographical distribution of students than ever before. Although the commitment to those greater Boston students has been maintained, these same students are now seeking the limited housing space previously reserved for those coming from a distance. The problem is compounded by the fact that housing is available for only 55 percent of the undergraduate population while 85 percent wish to live on campus. It was, therefore, interesting to see the results of the breakdown between those students who were on-campus residents compared with those who were not. The greatest differences between these two groups included: commuting too time consuming and needed a break ($p < .001$), unable to get housing and job/study conflict ($p < .01$), and no motivation ($p < .05$). Astin (1977) has repeatedly cited the importance of on-campus residence and our results affirm the importance of such accommodations. The ability to live on campus and take part in the activities and events associated with campus life remain among the most attractive benefits of going to college. Additionally, factors such as needed a break and no motivation might have been less likely to occur among students living with and sharing in the motivation of their peers in campus housing.

Our final breakdown took into consideration the fact that students who leave the school fall into two academic groups: GPA above 3.0 and GPA below 3.0. Students falling into these two categories had mean GPA's of 3.3 and 2.3 respectively. Significant differences were observed for the following items: low grades and needed a break ($p < .001$), no motivation, job/study conflict and illness ($p < .01$). These results are not surprising and are traditionally characteristic of students with below average GPA's.

What does all of this mean? Presumably it can be said with some confidence that there is no dropout "profile". Students are likely to leave for a variety of reasons having to do with their own personal lives, the services and facilities provided by the institution and their financial situation. The next question shifts to focus on the persisters to investigate their satisfaction with the institution.

Table II provides the results of dropout and persister responses to the question, "The following are factors which students consider when leaving school. Please rate them according to your degree of satisfaction." Unlike the responses given in reasons for leaving, the persisters now rank themselves above the withdrawals and show a greater satisfaction with the institution than the dropouts. The most significant differences ($p < .001$) were in the areas: extra-curricular opportunities, intellectual stimulation, relevance of major and the school in general. Cope and Hannah (1975) have mentioned the importance of "fit" between the student and the institution. The responses to this question appear to bear this out showing that students are more likely to persist if their environment is satisfactory including extracurriculars, academics and the institution in general.

TABLE II

MEAN RATINGS OF DEGREE OF SATISFACTION[1] WITH THE INSTITUTION

	Persisters N=95	Dropout N=109	T-value of difference[2]
Counseling services	2.77	2.61	0.96
Academic advisement	2.71	2.40	2.03*[3]
Library services	3.18	3.05	0.78
Employment opportunities	3.04	2.94	0.66
Financial aid opportunities	2.66	2.55	0.63
Cost of attending BC	2.34	2.11	1.62
Enrollment size of BC	3.49	3.07	2.68**
Extracurricular opportunities	4.04	3.45	3.70***
Intellectual stimulation	3.86	3.38	3.24***
Cultural opportunities	3.82	3.63	1.13
Social opportunities	4.01	3.52	3.13**
Recreational facilities	4.46	4.43	0.20
Location of BC	4.57	4.31	1.99*
Residence/living accommodations	3.10	3.09	0.05
Course content in your major field	3.56	3.35	1.34
Teaching in your major field	3.56	3.40	1.09
Amount of contact with your teachers	3.28	2.96	1.96*
Relevance of your major to career goals	3.70	3.14	3.48***
Quality of students	3.67	3.39	1.98*
The School in general	4.04	3.50	3.88***

[1] SCALE: 1 = Unsatisfactory . 5 = Excellent

[2] An approximation to the student's T is used which does not assume variances are equal

[3] $*p < .05$ $**p < .01$ $***p < .001$

TABLE III

A COMPARISON OF MEANS BETWEEN COLLEGE EXPECTATIONS AND ACTUAL EXPERIENCES[1]

	EXPECTATIONS			EXPERIENCES		
	Persister N=96	Dropout N=109	T-value of[2] difference	Persister N=96	Dropout N=109	T-value of[2] difference
Personal growth	3.85	3.95	-0.81	3.92	3.41	3.60***[3]
Intellectual growth	4.08	4.22	-1.35	3.62	3.30	2.30*
Career path clarification	3.97	3.74	1.58	3.10	2.54	3.10**
Clarification of personal values	3.36	3.46	-0.62	3.60	3.12	3.03**
Development of written communication skills	3.61	3.56	0.36	3.13	2.99	0.98
Development of oral communication skills	3.47	3.46	0.08	3.15	2.84	2.10*
Expansion of general knowledge	4.18	4.16	0.20	3.95	3.57	2.86**
Artistic experience	2.28	2.60	-1.85	2.19	2.19	-0.01
Athletic experience	2.80	2.73	.34	2.79	2.47	1.79
Clarification of social issues	3.10	3.16	-0.40	3.15	2.75	2.41*
Growth of ability in interpersonal relations	3.65	3.70	-0.31	3.78	3.28	3.02**

[1] SCALE: EXPECTATIONS 1 = Low to 5 = Very High

EXPERIENCE 1 = Poor to 5 = Excellent

[2] An approximation of the student's T is used which does not assume variances are equal

[3] *$p < .05$ **$p < .01$ ***$p < .001$

This reinforces responses provided under biographical data where differences also existed between GPA and extracurriculars.

Finally, Table III provides the responses students gave when asked to consider their expectations prior to entering Boston College compared to their actual experience. While everyone expected the same at the time of enrollment their experience very likely determined whether or not they would persist at BC since statistically significant differences abounded. Perhaps this has less to do with actual experience than with rationalizing or affirming a decision to stay or leave. Nevertheless, the results show largest differences (p .001) between the personal growth experienced by the dropout vs. the persister. This is followed by career path clarification, clarification of personal values, expansion of general knowledge, and growth in interpersonal relations, all significant at the .01 level. Of somewhat less importance, but still significant at the .05 level, was clarification of social issues and intellectual growth. Thus, for those who do not feel that they are experiencing growth in their personal and academic pursuits, withdrawal is more likely. This coupled with their earlier responses regarding the cost benefit of a BC education affirm that they come in search of growth and stimulation and are willing to pay the price if they find it.

Conclusion

The pursuit of research often yields its rewards when one is able to view changes resulting from that research. This study has clearly shown the importance that housing and financial aid can play in encouraging retention. At Boston College construction is now underway on a new 800-bed dormitory. Simultaneously, policies which would provide more housing for lower division students, those most likely to drop out, are also under serious consideration.

Another significant change has occurred in financial aid, resulting in a 100 percent increase in the amount of institutional aid available to students. Results of this study have also been presented to faculty, staff and administrative groups thus heightening campus awareness of the retention issue and stressing the importance of making it a campus-wide concern.

Certainly other factors were considered prior to the construction of a new dormitory yet the small part which this study may have played in that and other decisions has reaffirmed the importance of conducting in-house surveys to determine student reasons for withdrawal.

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Optimizing Quality With Need Based Financial Aid At Boston College

James Scannell
John Maguire
Boston College

The shrinking population of college bound youth, rapidly rising college costs, and the labor market's declining need for a college-educated work force, will all impact enrollment in the 1980's. University and College administrators will be managing at best a dynamic equilibrium, at worst a severe,. potentially catastrophic decline. Need-based financial aid will become not only an instrument to influence access and choice, but also a marketing tool to induce enrollment, particularly the enrollment of those students the institution most desires.

As a result of market research on financial aid, Boston College considerably increased its commitment of discretionary financial aid to freshmen (Maguire, NEAIR 1978). In addition an examination of data collected on approximately 10,000 accepted aid applicants to the classes of 1975-1977 indicated that for a constant gap (the difference between need and total aid from all sources) yield will increase with increasing need. With this in mind Boston College readjusted its funding policies to increase enrollments from the most desireable accepted applicants who also displayed a financial need. "Most desireable" generally means the highest ability students as measured by the overall admissions rating (1 to 10, non-linear, scale based on the combined evaluation of academic and personal achievement and promise such as rank in class, SAT's, extra-curricular activities, essays, recommendations, interviews, etc.)

As can be seen from Table I the readjustment in policy resulted in an increased yield of the highest quality students (Rated #1) from the Class of 1977 to the Class of 1979. However, because of a fixed budget for discretionary institutional funds and increasing costs (tuition, room and board) during this time, this increase came at the expense of other highly qualified students (those rated 2-4). With the market research data in support, discretionary aid was doubled (first effects seen in 1981). Finally, the Class of 1982 enrollees show more consistently increased yields across all ratings. Table II provides quality comparisons by raw numbers.

Table I

Yield Percentages by Rating for Applicants to
the Classes of 1977 through 1982

All Applicants

Rating	1977	1978	1979	1980	1981	1982
1	20.6	30.4	37.3	13.9	20.9	28.5
2	32.0	30.9	28.6	21.6	28.0	36.4
3	37.6	33.3	28.3	26.4	31.0	38.3
4	38.0	35.7	35.0	34.3	35.9	43.9
5	36.6	39.7	41.4	34.2	35.4	42.3

6	38.4	40.5	43.6	38.2	39.8	47.3
7	43.0	43.9	47.0	46.1	45.9	61.6
8	51.6	54.6	49.7	53.7	49.5	65.5
9	61.0	54.3	80.7	53.7	59.0	87.5
10	62.5	83.6	85.7	83.3	42.8	100

Table II

FRESHMAN CLASS - QUALITY COMPARISONS

	Deposits Class of 1982	Deposits Class of 1981	Deposits Class of 1980
Rating 1	24	17	12
Rating 2	144	100	77
Rating 3	365	253	206
Rating 4	449	335	299
Rating 5	287	329	293

During this same period of time a number of other events were simultaneously impacting the world of student financial aid:

1. B.E.O.G. - A federal government entitlement program created in 1972 became one of the largest student aid programs. (veterans benefits and social security being the other two)
2. C.S.S. and A.C.T. after long negotiations and considerable compromising, announced sweeping revisions in needs analyses (Uniform Methodology) in 1974, thereby drastically reducing the expected level of parental contributions. For a family of four with an income of $17,500, home equity of $25,000 and $5,000 savings (all in 1978 dollars) expected parental contributions calculated by

C.S.S. fell from $853 in 1974 to $103 in 1979 as a result of these revisions.

3. Late in 1978 the Middle Income Student Assistance Act reduced the taxation rate for the middle income group in eligibility for B.E.O.G. and made it possible for families to borrow against their own P.C. (Parental Contribution) through the Guaranteed Insured Loan Programs (G.I.L.). In addition income ceilings for G.I.L. were also erased.

RESULTS OF FUNDING STRATEGIES: CLASS OF 1983

There were 12,500 freshman applicants to the Class of 1983. 4,514 were accepted and 2,081 eventually enrolled. 2,148 of the 4,500 accepted applicants applied for and completed their financial aid application. 1,117 of all accepted aid applicants enrolled for a yield of 52%. The average need of the accepted applicants who applied for aid was $4,029. The average award received was $2,598. Awards were made by computer employing a Quality/Need grid. See table III.

As can be seen by this example, money was awarded in this admissions rating category by need. In general an attempt was made to underfund all need categories by a fixed gap ($1,000) except for those students rated #1 and #2 (Equity packaging) Beyond this the goal was to distribute aid so as to reduce the factor of net cost in a student's decision to enroll across all quality categories.

Table IV displays the yield on those cells. Gap is the vertical axis in 1,000 increments, need is the horizontal axis

Table 3

CODE 011103181

SCHOOL 01 = ARTS AND SCIENCES

SEX 1 = MALE

HOUSING 1 = RESIDENT

RATING 03

RACE 1 = NON MINORITY

YEAR 81

DOLLAR LIMITATION GROUP

1. 1,000
2. 150
3. 900
4. 300
5. 500
6. 800
7. 18,000
8. 800
9.
10.

0000 - 1000										
1001 - 2000	BCG01	1,000								
2001 - 3000	BCG01	1,000	NDL	1,000						
3001 - 4000	BCG01	1,000	NDL	1,000	EOG01	750				
4001 - 5000	BCG01	1,000	NDL	1,000	EOG01	750	TSE01	1,500		
5001 - 6000	BCG01	1,000	NDL	1,000	EOG01	750	TSE01	1,500		
6001 - 7000	BCG01	1,000	NDL	1,000	EOG01	750	TSE01	1,500		
7001 - 8000	BCG01	1,000	NDL	1,000	EOG01	750	TSE01	1,500		
8001 - 9000	BCG01	1,000	NDL	1,000	EOG01	750	TSE01	1,500		
9001 - 10000	BCG01	1,000	NDL	1,000	EOG01	750	TSE01	1,500		

Table 4.

```
CROSSBREAKS CLASS OF 1984 (ENTERED IN 1980)                                    10/09/79        PAGE    4

FILE    JAMES     (CREATION DATE = 10/09/79)

* * * * * * * * * * * * * * * * * * * *   C R O S S---B R E A K D O W N   O F   * * * * * * * * * * * * * * * * * * * *
     GAPSUB                                                        BY  NEEDSUB
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
VARIABLE AVERAGED...       YD
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *  PAGE  1 OF  1

                      NEEDSUB
                 MEAN I
                COUNT I                                                                                                    ROW
              STD DEV I                                                                                                   TOTAL
                      I        1 I        2 I        3 I        4 I        5 I        6 I        7 I        8 I        9 I
GAPSUB       ---------I----------I----------I----------I----------I----------I----------I----------I----------I----------I
                  1   I     0.51 I     0.41 I     0.56 I     0.50 I     0.50 I     0.59 I     0.55 I     0.73 I      0.0 I        0.52
                      I      323 I       80 I       69 I       56 I       88 I       67 I       60 I       33 I        0 I         776
                      I     0.15 I     0.20 I     0.19 I     0.27 I     0.26 I     0.27 I     0.29 I     0.22 I      0.0 I        0.22
                     -I----------I----------I----------I----------I----------I----------I----------I----------I----------I
                  2   I      0.0 I     0.53 I     0.49 I     0.49 I     0.53 I     0.52 I     0.56 I     0.54 I     1.00 I        0.52
                      I        0 I       71 I      129 I      166 I      192 I      183 I      139 I       33 I        2 I         915
                      I      0.0 I     0.14 I     0.14 I     0.18 I     0.19 I     0.19 I     0.22 I     0.19 I      0.0 I        0.19
                     -I----------I----------I----------I----------I----------I----------I----------I----------I----------I
                  3   I      0.0 I      0.0 I     0.58 I     0.56 I     0.54 I     0.44 I     0.49 I     0.60 I     1.00 I        0.51
                      I        0 I        0 I       10 I       52 I       97 I       85 I       43 I       15 I        1 I         303
                      I      0.0 I      0.0 I     0.17 I     0.18 I     0.20 I     0.27 I     0.21 I     0.18 I      0.0 I        0.23
                     -I----------I----------I----------I----------I----------I----------I----------I----------I----------I
                  4   I      0.0 I      0.0 I      0.0 I     0.49 I     0.57 I     0.45 I     0.60 I     0.56 I      0.0 I        0.53
                      I        0 I        0 I        0 I       20 I       32 I       27 I       19 I        5 I        0 I         103
                      I      0.0 I      0.0 I      0.0 I     0.23 I     0.27 I     0.41 I     0.26 I     0.38 I      0.0 I        0.31
                     -I----------I----------I----------I----------I----------I----------I----------I----------I----------I
                  5   I      0.0 I      0.0 I      0.0 I      0.0 I     0.59 I     0.57 I     0.62 I     0.50 I     1.00 I        0.61
                      I        0 I        0 I        0 I        0 I        9 I       11 I       13 I        2 I        2 I          37
                      I      0.0 I      0.0 I      0.0 I      0.0 I     0.37 I     0.37 I     0.25 I     0.71 I      0.0 I        0.34
                     -I----------I----------I----------I----------I----------I----------I----------I----------I----------I
                  6   I      0.0 I      0.0 I      0.0 I      0.0 I      0.0 I     0.19 I     1.00 I      0.0 I      0.0 I        0.35
                      I        0 I        0 I        0 I        0 I        0 I        4 I        1 I        0 I        0 I           5
                      I      0.0 I      0.0 I      0.0 I      0.0 I      0.0 I     0.24 I      0.0 I      0.0 I      0.0 I        0.42
                     -I----------I----------I----------I----------I----------I----------I----------I----------I----------I
                  7   I      0.0 I      0.0 I      0.0 I      0.0 I      0.0 I      0.0 I     0.17 I      0.0 I      0.0 I        0.17
                      I        0 I        0 I        0 I        0 I        0 I        0 I        6 I        0 I        0 I           6
                      I      0.0 I      0.0 I      0.0 I      0.0 I      0.0 I      0.0 I     0.41 I      0.0 I      0.0 I        0.41
                     -I----------I----------I----------I----------I----------I----------I----------I----------I----------I
                  8   I      0.0 I      0.0 I      0.0 I      0.0 I      0.0 I      0.0 I      0.0 I     0.33 I      0.0 I        0.33
                      I        0 I        0 I        0 I        0 I        0 I        0 I        0 I        3 I        0 I           3
                      I      0.0 I      0.0 I      0.0 I      0.0 I      0.0 I      0.0 I      0.0 I     0.58 I      0.0 I        0.58
                     -I----------I----------I----------I----------I----------I----------I----------I----------I----------I
      COLUMN TOTAL          0.51       0.47       0.52       0.50       0.53       0.51       0.55       0.62       1.00         0.52
                             323        151        208        294        418        377        281         91          5         2148
                            0.15       0.19       0.17       0.21       0.22       0.26       0.25       0.25        0.0         0.22

RAW CHI SQUARE =  1034.43994 WITH    56 DEGREES OF FREEDOM.  SIGNIFICANCE =  0.0000

NUMBER OF MISSING OBSERVATIONS =          13
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Table 5.

```
CROSSBREAKS CLASS OF 1984 (ENTERED IN 1980)                                       10/09/79        PAGE   16

FILE   JAMES    (CREATION DATE = 10/09/79)

* * * * * * * * * * * * * * * * * * *   C R O S S---B R E A K D O W N   O F   * * * * * * * * * * * * * * * * * * *
    GAPSUB                                               BY  FREENEED
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
VARIABLE AVERAGED...      DP
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *  PAGE  1 OF  1

                    FREENEED
              MEAN I
             COUNT I                                                                                       ROW
           STD DEV I                                                                                       TOTAL
                   I       1 I       2 I       3 I       4 I       5 I       6 I       7 I       8 I
GAPSUB     --------I---------I---------I---------I---------I---------I---------I---------I---------I
                 1 I    0.46 I    0.59 I    0.63 I    0.80 I    0.71 I    1.00 I    1.00 I     0.0 I     0.51
                   I     578 I      81 I      57 I      44 I      14 I       1 I       1 I       0 I      776
                   I    0.50 I    0.49 I    0.49 I    0.41 I    0.47 I     0.0 I     0.0 I     0.0 I     0.50
                  -I---------I---------I---------I---------I---------I---------I---------I---------I
                 2 I     0.0 I    0.49 I    0.51 I    0.51 I    0.64 I    0.81 I     0.0 I     0.0 I     0.53
                   I       0 I     514 I     187 I      84 I      98 I      32 I       0 I       0 I      915
                   I     0.0 I    0.50 I    0.50 I    0.50 I    0.48 I    0.40 I     0.0 I     0.0 I     0.50
                  -I---------I---------I---------I---------I---------I---------I---------I---------I
                 3 I     0.0 I     0.0 I    0.51 I    0.55 I    0.54 I    0.80 I    1.00 I     0.0 I     0.54
                   I       0 I       0 I     175 I      86 I      26 I      15 I       1 I       0 I      303
                   I     0.0 I     0.0 I    0.50 I    0.50 I    0.51 I    0.41 I     0.0 I     0.0 I     0.50
                  -I---------I---------I---------I---------I---------I---------I---------I---------I
                 4 I     0.0 I     0.0 I     0.0 I    0.47 I    0.52 I    0.71 I    0.75 I     0.0 I     0.52
                   I       0 I       0 I       0 I      62 I      23 I      14 I       4 I       0 I      103
                   I     0.0 I     0.0 I     0.0 I    0.50 I    0.51 I    0.47 I    0.50 I     0.0 I     0.50
                  -I---------I---------I---------I---------I---------I---------I---------I---------I
                 5 I     0.0 I     0.0 I     0.0 I     0.0 I    0.59 I    0.60 I    0.67 I    1.00 I     0.62
                   I       0 I       0 I       0 I       0 I      22 I      10 I       3 I       2 I       37
                   I     0.0 I     0.0 I     0.0 I     0.0 I    0.50 I    0.52 I    0.58 I     0.0 I     0.49
                  -I---------I---------I---------I---------I---------I---------I---------I---------I
                 6 I     0.0 I     0.0 I     0.0 I     0.0 I     0.0 I    0.40 I     0.0 I     0.0 I     0.40
                   I       0 I       0 I       0 I       0 I       0 I       5 I       0 I       0 I        5
                   I     0.0 I     0.0 I     0.0 I     0.0 I     0.0 I    0.55 I     0.0 I     0.0 I     0.55
                  -I---------I---------I---------I---------I---------I---------I---------I---------I
                 7 I     0.0 I     0.0 I     0.0 I     0.0 I     0.0 I     0.0 I    0.17 I     0.0 I     0.17
                   I       0 I       0 I       0 I       0 I       0 I       0 I       6 I       0 I        6
                   I     0.0 I     0.0 I     0.0 I     0.0 I     0.0 I     0.0 I    0.41 I     0.0 I     0.41
                  -I---------I---------I---------I---------I---------I---------I---------I---------I
                 8 I     0.0 I     0.0 I     0.0 I     0.0 I     0.0 I     0.0 I     0.0 I    0.33 I     0.33
                   I       0 I       0 I       0 I       0 I       0 I       0 I       0 I       3 I        3
                   I     0.0 I     0.0 I     0.0 I     0.0 I     0.0 I     0.0 I     0.0 I    0.58 I     0.58
                  -I---------I---------I---------I---------I---------I---------I---------I---------I
     COLUMN TOTAL       0.46      0.51      0.53      0.56      0.61      0.74      0.53      0.60       0.52
                         578       595       419       276       183        77        15         5       2148
                        0.50      0.50      0.50      0.50      0.49      0.44      0.52      0.55       0.50

RAW CHI SQUARE =  4758.47656 WITH    49 DEGREES OF FREEDOM.  SIGNIFICANCE =  0.0000

NUMBER OF MISSING OBSERVATIONS =         13
```

in increments of 1,000. Therefore, in cell 3-1 there were 69 accepted aid applicants with a need between $2,000 - $3,000 and a gap of between $0 - $1,000 after aid was awarded. Approximately one out of two students from this category enrolled at Boston College.

By looking at the yields it can be seen that, for a fixed need, as gap increases there is little change in yield. This is contrary to previous findings (Maguire, 1978) but consistent with the goals of our new funding strategies. Quality is the primary cause of this phenomenom. Significant funds were allocated to those cells where quality/need was high, thereby increasing the yield. On the other hand, little if any, discretionary money beyond federal money was awarded to those accepted applicants of lesser ability. The lesser ability applicants however, enroll at a higher rate for a given gap because they look upon Boston College in a much more favorable light, having fewer and (in their view) less attractive offers than the higher quality students. They (lower ability students and their families), were prepared therefore to make greater sacrifices to attend Boston College.

By redefining need, the yields became more significant. Table V displays the response rate of accepted financial aid applicants, isolating the effect of discretionary Boston College funds (scholarship and grants)." Freeneed" on the horizontal axis is defined as need minus total aid plus discrationary aid or

(Freeneed = Need - (All aid - discretionary aid).

Gap remains the same and the ranges are still in intervals of $1,000.

By isolating how people respond to only discretionary money within need categories, response from high quality students can be studied. With the exception of minority students (approximately 100), all discretionary money was awarded by quality and need. Therefore, for a fixed gap, yield increases with need as more discretionary aid is awarded. In like fashion, for a fixed need, yield decreases as gap increases. For the most part the enrollees in the high gap categories are those lower rated students (admissions rating 5-10).

CONCLUSIONS

By comparing the old and new data, especially allowing for changes that have taken place in student aid over the past five years, it is possible to award discretionary funds in such a way as to impact the decision to enroll by high quality students. Certainly the value placed on education by each student and his family remains of utmost importance.

Trends do evolve however after disaggregating financial aid tables, assessing probabilities of enrollment, for individuals and reaggregating to predict yields according to need and quality. Although some modeling is needed to trend these patterns perfectly, most inconsistencies are the result of small cells.

Costs will continue to escalate in this inflationary economy. It is unlikely that resources can increase fast enough to match costs. As the demand on funds therefore grows -- or, to state it another way, as discretionary aid becomes more scarce -- strategies which will optimize enrollment, quality, etc., will become more important. The distribution of aid will affect quality at the most selective colleges and universities, while it will influence survival at those schools where demand for admission is less competitive.

Not all conclusions reached with these data are transferable, but hopefully some frame work for other institution-based studies has been provided.

Student/Parent Perceptions of Financial Aid and the Resulting Impact on Financial Aid Operations

J. Stephen Collins, Robert M. Turner, John J. Maguire
Boston College

It has long been an operating principle of those involved with all types of human interaction that one must deal with the way in which a written document, a service, an event, a discussion, etc. is perceived and not merely with the way in which it is intended or objectively described. Financial Aid Officers, like many others in service-oriented professions, are ever mindful of this distinction and are well-advised to identify the types of student or parental perceptions about financial aid which appear to be the most significant, evaluate them against existing operations and strategies, and modify these operations and strategies as necessary.

At Boston College, a number of studies and observations have been made which have provided an insight into the perceptions held by its clientele in the areas of Financial Aid and Admissions. These perceptions could have an impact on the way in which financial aid services, or indeed financial aid packages, should be developed and provided.

Preliminary research has provided interesting results and has raised more questions to be investigated further. Perception problems have been divided into those that affect an admissions decision and those related to financial aid after the student has made the decision to attend the university. The former group, admissions applicants who are also first-time aid applicants, are the families most confused by the process and yet they represent the group most in need of accurate information since the aid decision has a very strong bearing on college choice. For this reason, they were determined to be a group worth further study.

A student's financial need is defined as the budget of a particular institution less a calculated family contribution. The family contribution is determined by a uniform need analysis methodology taking into consideration variables such as income, assets, taxes, size of the household and number in postsecondary education. While colleges and universities are required by federal regulations to use an approved need analysis system, in many cases families themselves appear to use instead a self-estimated need based upon more subjective factors such as life-style, willingness to contribute to education, and their perceptions of the value of an education. In connection with an article on unmet need, that is, need minus aid (Collins et al. 1979, pp. 4-16), research has begun on the topic of College Scholarship Service (CSS) need versus self-estimated need and its impact upon the decision to attend Boston College. While the initial data seem to indicate that CSS need is greater than self-estimated need, the self-estimated need is lower for those who deposited at Boston College than it is for those who did not deposit. The CSS need, however, was identical for both populations and thus it appears that families are more concerned with how awarded aid relates to a self-estimate of need than how it compares with a CSS need figure. In addition, the unmet need based upon self-estimated need and aid offered was 42% higher for resident students and 109% higher for commuters who did not deposit than for those who did.

Data from the CSS on aid filers at Boston College also seem to support the hypothesis that self-estimated need is especially critical at the freshman level. Table I lists number of filers and calculated parents' contribution (PC) amounts for the past three years for all undergraduate students who requested that a Financial Aid Form (FAF) be sent to Boston College. The larger number for the freshman year reflects the fact that all those who filed for aid, regardless of whether or not they were accepted or deposited, are included.

Table I

Parental Contributions for Aid
Applicants at Boston College
1977-78 to 1979-80

Year in School	1977-78		1978-79		1979-80	
	#	PC	#	PC	#	PC
Freshman	6075	1928	5333	2136	5424	2456
Sophomore	968	1383	1114	1540	1301	1611
Junior	917	1497	935	1502	1051	1685
Senior	622	1390	628	1450	689	1443

In each year, while the upper three classes were grouped fairly close together in terms of parental contribution, those applying as Freshmen differed in PC by a range of 550-850 from those applying as sophomores. Again, the hypothesis subject to further testing is that the higher PC from CSS differs from what families feel they can contribute. Since aid may not meet their expectations, families from higher income categories may fail to enroll due to the discrepancy between aid offered and their estimate of need. Parental Contribution (PC) is based on income as well as assets (liquid and non-liquid) and middle and upper-middle income families may feel they cannot meet this higher expectation due to a higher style of living which income and assets have provided and which cannot easily be relinquished.

Once a student decides to attend a particular school, perceptions continue to enter into the aid process. For example, many schools typically are forced into a situation of funding aid applicants below their calculated need due to limited dollars in certain programs and an expanding population of eligible aid applicants. In an attempt to determine how students closed this need gap, the recently revised student aid application at Boston College requires students to balance their resources and expenses for the previous academic year. This new application, now entering its third year of use, has significantly increased students' awareness of their educational expenses and the resources necessary to meet these expenses. In the first year of operation, however, many applications had to be returned because students had listed amounts for tuition. room, and board that were significantly less than the actual amounts they had been charged. Others listed total expenses that exceeded total resources by $2000 or more, a clearly impossible situation.

Along with problems related to balancing resources and expenses, students seemed unaware of the types and amounts of aid they were actually receiving. Thus, the new application procedure has also served to reinforce information supplied to the student at the time an award was made and has required them to consider the parental and self-help (loan or employment) aspects of budgeting for educational costs.

In order to meet the problem of underfunding of need, many students must increase funds available by resorting to additional loan sources, additional work (summer and term), and a parental contribution above that which is required by a CSS need analysis calculation (Collins et al, 1979, p. 4-16). While the institution is the beneficiary of such a positive attitude toward higher education in general or Boston College in particular, this situation is not without its inherent risks. A recent study done by the Financial Aid Office, for example, compared borrowing patterns for two freshmen classes. those who entered the university in 1975 and those entering in 1978. While the two classes were identical in size, the percentage of students who were borrowing from some educational loan program had risen from 34% in 1975 to 50% in 1978. Of those borrowing in 1978, 27% found it necessary to borrow from two loan sources with an average indebtedness of $2750 for one year in college versus 16% who borrowed from two sources in 1975 (average indebtedness - $2450). If left unchecked, this type of borrowing could have a negative impact on the student while he or she is still in school and could seriously affect alumni relations for years after graduation as well. (NACUBO, 1979, p. 41.)

The results of the quantitative research discussed above. as well as the untested hypotheses or unconfirmed suspicions which have resulted, suggest a number of steps which the Boston College Admissions and Financial Aid Offices should take to minimize the negative effect of perceptions on parents and students. This endeavor should begin by educating parents and students prior to admission (and continuing during the upper-class years) as to the facts that govern the financial aid process and the context within which financial aid for college should be considered. More emphasis will need to be placed, for example, on the standard operating principle that financial aid for a traditional dependent student is a family responsibility with contributions expected from both the student and parents. In addition to factual information on costs and the like, the more routine aspects of filing a financial aid application need to be stressed (e.g., deadlines) since each year many students jeopardize their chances of receiving financial assistance by failing to comply with one or more of these requirements.

In some cases, the self-imposed psychological barriers of the student or parent will need to be confronted when a feeling exists that there is a stigma attached to completing a financial aid application. Parents and students should also be reminded that there are a number of variables which affect a need analysis (income, assets, family size, number in college, etc.), that one of the factors influencing a final decision on attendance should be the financial aid package offered in light of the school's particular cost of attendance, and that a school's policy on the amount (and type) of renewal aid should be known in advance.

Finally, the entire family needs to be encouraged to set up a long-range financial plan which analyzes the expected cost of attendance at various institutions and the ability of the family to meet these costs. If loans are part of the plan, consideration should be given to the amount of debt which the student/family can reasonably manage and the relative importance of education to the family when compared with other consumer purchases which may involve the use of debt. If part time or summer employment by the student is part of the plan, realistic estimates of earnings should be devised which make full use of the employment time available but which do not seriously interfere with the student's academic schedule.

Like most postsecondary institutions, Boston College has literature available which provides some of this information and other factual data to current and prospective students, but written information often has limited impact when it is not accompanied by personal contact. As a result, more effort has been made during the last year to acquaint Admissions Counselors and student volunteers with some of the considerations mentioned above so that these might be included in presentations to students and parents both on and off campus. In addition, and when work schedules allow, a member of the Financial Aid Office staff is available to talk with individual students or parents on request when they visit the campus for an admissions interview. Finally, an information packet tailored to the financial planning process is being developed for distribution to the parents of prospective freshmen in particular. All of these efforts, as well as the continuing contact with upperclass students and their parents, should succeed in making the approach or attitude toward financial aid more objective and in fostering a more positive impression of the institution in the minds of those affected.

While these efforts are worthwhile, however, they are by no means a substitute for other activities which should be taking place within the Financial Aid Office or the institution itself. Among these activities at Boston College are the development of financial aid packaging strategies and the development of a long range financial aid plan for the institution, including some attention to pricing policy. Particularly at private institutions without substantial endowments, costs of attendance and the resulting number of financial aid applicants typically are growing faster than most of the financial aid programs. Although some federal or state aid programs have experienced significant increases during the last few years, a leveling off of this growth is almost inevitable and this suggests that more must be done at the institutional level.

Other research at Boston College has indicated that relationships do exist between the willingness of a student to attend and the amount or type(s) of aid received relative to need. More research in this area of packaging will need to be done by the University, and by institutions with similar circumstances, to determine how far existing resources can be spread. This research should be done with a view toward maximizing the quality and yield of financial aid recipients and at the same time offering a financial aid package which is equitable and not excessively laden with loans and employment. More importantly, however, the situation indicates strongly a more comprehensive method of allocating institutional aid must be developed, one which does not merely increment financial aid by a percentage equivalent to the rise in tuition but which looks as well at the increase in all costs of attendance, the annual increase in the number of financial aid applicants, the gross need of these applicants, and the amount and type of other aid available. For Boston College and other institutions heavily dependent on operating revenue, studies should also be conducted on the amount of operating revenue needed to fulfill projected financial aid requirements and the effect of this decision on the annual process of setting tuition and fee levels. This entire analysis lends itself to a simulation or modeling technique which would seek to quantify all relevant variables and provide alternatives to different sets of assumptions. It is important for Boston College to obtain this information by one method or another in order to facilitate long range planning for the institution as a whole.

This paper has attempted to analyze some typical perceptions of financial aid identified by research and by normal daily activity among Boston College financial aid applicants and their parents. The advantages and disadvantages of these perceptions were stressed, along with the advisability of removing the negative effect of incorrect perceptions by means of improved written materials and more personal contact. Other major implications included the need to develop strategies which will maximize the use of available financial aid funds and the necessity of long range financial aid projections as part of the overall financial plan for the institution.

References

Collins, J. Stephen, Robert M. Turner and John J. Maguire. "Unmet Need: How the Gap is Filled," The Journal of Student Financial Aid, Vol. IX, No. 2, May 1979, pp. 4-16.

Management of Student Aid, National Association of College and University Business Officers, Washington, D.C., 1979.

APPENDIX

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NORTH EAST ASSOCIATION FOR INSTITUTIONAL RESEARCH

SIXTH ANNUAL CONFERENCE
OCTOBER 14 - 16, 1979
COOPERSTOWN, NEW YORK

INSTITUTIONAL RESEARCH AND CREATIVE CHANGE

SUNDAY, OCTOBER 14, 1979

1:30 to 4:30	REGISTRATION – *LOBBY*
4:15 to 4:30	WELCOME AND OPENING – *BALLROOM*
4:30 to 5:30	"THE VIEW FROM HERE" – *BALLROOM* (NEAIR panelists from Government, State Systems, Universities and Colleges look ahead to possibilities for Institutional Research) Molly C. Broad, Syracuse University Eric Brown, New Hampshire College and University Council Roger C. Andersen, Allegany Community College James R. Speegle, Rochester Institute of Technology
5:30 to 6:30	SOCIAL HOUR – CASH BAR – *TEMPLETON LOUNGE*
6:30 to 7:45	CONFERENCE DINNER – *MAIN DINING ROOM*
7:45 to 8:30	*BALLROOM* KEYNOTE SPEAKER: Professor Benjamin DeMott (Author, critic, columnist) Creative Changes Ahead in Higher Learning
9:00 to 10:00	*STATE ROOM* I. R. Newcomers' Reception with NEAIR Steering Committee as Host (Those new to the field are invited to get acquainted with NEAIR officers)

MONDAY, OCTOBER 15, 1979

8:00 to 10:00 REGISTRATION – *LOBBY*

BALLROOM

Session Chair: Loren Gould
Worcester State College

8:30 "NEW THINGS" A. Lois Torrence and Professor Charles McLaughlin of the University of Connecticut – Report on ACT's College Outcomes Measures Project (COMP)

9:15 "NEW THINGS" B. A presentation by Integrated Software Systems Corp. (ISSCO) of outstanding computer graphics
Charlie Saunders – Applied Urbanetics

STATE ROOM

Convener and Session Chair: Paul Wing
Education Department of New York

8:30 SPECIAL SYMPOSIUM I:
"Institutional Planning for a Decade of Decline"
Glenwood L. Rowse
Jane C. Frank
Paul Wing
Office of Postsecondary Research Information Systems and Institutional Aid,
State Education Department of New York

10:00 to 10:30 COFFEE HOUR – *ROTUNDA*

STATE ROOM

10:30 PAPER SESSION I – COSTS

Session Chair: Albert Elwell
University System of New Hampshire

"A Locally Discriminate Economic Impact Study – Design and Results"
David L. Rumpf
Alison Cox
Gary Hill
University of Massachusetts-Amherst

11:00 "Costs, Costs, Who Gets the Costs?"
Michael E. Baker
Frederick A. Rogers
Carnegie-Mellon University

11:25 "Instructional Cost Analysis at a Small College"
William W. Watts
The King's College

11:45 "A Formula Budgeting Incentive Factor in a Declining Enrollment Environment"
John J. Kehoe
Pennsylvania Department of Education

12:05 "An Academic Income-Cost Model for Institutional Planning"
Edward D. Jordan
The Catholic University of America

COUNCIL ROCK ROOM

10:30 PAPER SESSION II – STUDENTS

Session Chair: Helen S. Wyant
SUNY - Buffalo

"Determining the 'Importance' of Reasons for Choosing Individual Colleges"
Jean M. Stern
Siena College

10:50 "A Discussion of the Validity of the Student - Consumer Model when Compared to Consumerism in General"
Ronald H. Stein
SUNY - Buffalo

11:15 "Perception – Is it Just in the Mind of the Beholder?"
Ami Meganathan
Carnegie-Mellon University

11:40 "Assessing the Quality of Student Life"
Robert F. Grose
Amherst College

12:00 "Grade Inflation: A Review of the Literature"
Wendell G. Lorang, Jr.
SUNY - Albany

BASEBALL ROOM

10:30 PAPER SESSION III – METHODS AND SYSTEMS

Session Chair: Jan Hastings
Keene State College

"A Conceptual and Methodological Approach to the Identification of Peer Institutions"
Patrick T. Terenzini
Leif Hartmark
Wendell G. Lorang, Jr.
Robert C. Shirley
SUNY - Albany

10:55 "On the Use and Misuse of Systems Approaches"
Allen H. Kuntz
SUNY - Buffalo

11:20 PAPER SESSION IV

Session Chair: Eric Brown
New Hampshire College and University Council

"Creative Change Through Cooperation"
Roger C. Andersen
James T. Tschechtelin
Allegany Community College

11:40 "The Enrollment and Funding of Higher Education for Urban, Suburban, and Rural Residents of Maryland"
Thomas M. Edwards
Frostburg State College

12:00 "Energy Conservation Techniques for Schools"
Peter J. Philliou
Wentworth Institute of Technology

12:30 to 2:00 LUNCHEON – *MAIN DINING ROOM*

Monday, October 15, 1979 (cont.)

BALLROOM

2:00 to 4:30 SPECIAL SYMPOSIUM II: MANAGING STUDENT ENROLLMENT: THE BOSTON COLLEGE STORY

Convener and Session Chair: John J. Maguire

"The Role of Research in Enrollment Management"
John J. Maguire

"Information Systems in Enrollment Management"
William T. Griffith
John J. Maguire

"A Segmentation Analysis Using an Institutionally Based Measure of Quality"
Robert Lay
John J. Maguire

"A Study of Dropouts and Persisters at Boston College"
Louise Lonabocker
John J. Maguire
Robert Lay

"Optimizing Quality with Need-Based Financial Aid at Boston College"
James Scannell
John J. Maguire

"Student and Parent Perceptions of Need and the Resulting Impact on Financial Aid Operations"
Stephen J. Collins
Robert M. Turner
John J. Maguire

STATE ROOM

2:00 PAPER SESSION V – PLANNING

Session Chair: Larry Benedict
University of Massachusetts
Amherst

"Strategic Long Range Planning for Universities"

Michael E. Baker
Carnegie-Mellon University

2:30 "Planning Support Systems: Quarterly Reports and EFPM"

John W. Rudan
R. Wade Schuette
Cornell University

3:30 "Planning Markets for Adult Learning"

Albert Elwell
Moe Olivier
University System of New Hampshire

4:30 to 5:30 NEAIR ANNUAL BUSINESS MEETING – *BALLROOM*

(Eric Brown Presiding)

OPEN EVENING

MEETINGS FOR SPECIAL INTEREST GROUPS AS REQUESTED

TUESDAY, OCTOBER 16, 1979

7:15 to 8:30 BREAKFAST MEETING FOR NEW STEERING COMMITTEE

BALLROOM

Session Chair: Richard Heck
Colgate University

8:30 "NEW THINGS" C. Council for the Advancement of Small Colleges (CASC)
"CASC Planning and Data System"
E. Russell Goodnow
Barrington College

9:15 "NEW THINGS" D. CEEB/NCHEMS
Student Outcomes Questionnaires and Implementation Handbook

STATE ROOM

8:30 SPECIAL SYMPOSIUM III – WORK IN PROGRESS (Thumbnail Sketches of Major Projects at Three Institutions)

Convener and Session Chair: Patrick T. Terenzini
SUNY - Albany

Wendell G. Lorang, Jr.
SUNY - Albany
Loren Gould
Worcester State College
Carl Feigenbaum
Brookdale Community College

Tuesday, October 16, 1979 (cont.)

10:00 to
10:30

COFFEE HOUR – *ROTUNDA*

STATE ROOM

10:30 SPECIAL SYMPOSIUM IV

Convener and
Session Chair: Peter Farago
Boston University

"Concepts and Techniques in Enrollment Projections"

Adolph I. Katz
New Jersey Department of Higher Education

David Bradley
Boston University

Barbara Rudy
Boston University

BASEBALL ROOM

10:30 PAPER SESSION VI – FACULTY

Session Chair: Edith Daly
Hartwick College

"The Departmental Profile – A Better Value-Added Index"

Diana M. Green
Jean V. Morlock
SUNY - Plattsburgh

10:55 "A Software Approach to Unscheduled Instructional Hours and Accounting for their Effect on FTE's and Facilities Utilization"

Kathleen E. Kopf
SUNY - Albany

11:15 "Faculty Activity Analysis – Group Similarities and Differences"

Louis M. Spiro
SUNY - Brockport

11:35 "A Faculty Flow Model for Estimating Realistic Affirmative Action Goals"

Simeon Slovacek
Cornell University

12:00 "Faculty Resource Reallocation – A Practical Methodology"

Frank Campanella
Boston College

COUNCIL ROCK ROOM

10:30 PAPER SESSION VII – STUDENT MIGRATION AND ATTRITION

Session Chair: Elizabeth Knapp
SUNY - Binghamton

"An Analysis of Factors Affecting Migration of Freshmen Applicants at Selected Public Institutions of Higher Education in Connecticut"

Doreen Frankel
Gary Cooley

Connecticut Board of Higher Education

11:00 "A Developmental Model for College Attrition"

Louis Zrebiec
SUNY - Buffalo

12:30

ADJOURNMENT
